GREEN RIVER-HAMS FORK

COAL REGION

ROUND TWO

FINAL ENVIRONMENTAL IMPACT STATEMENT

Prepared by
THE DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COLORADO STATE DIRECTOR

ERRATA
for the Draft Green River-Hams Fork Environmental Impact Statement

Federal lands within the Corral Canyon tract have very recently been included in a land exchange. Since the lands are now in private ownership they will not be part of the Department of Interior's coal leasing process.

The Final Green River-Hams Fork Environmental Impact Statement will reflect any necessary changes in analysis, or presentation of material, resulting from the exchange.

GREEN RIVER-HAMS FORK

REGIONAL COAL

ENVIRONMENTAL IMPACT STATEMENT

ROUND II

Draft ( ) Final (X)

The United States Department of Interior, Bureau of Land Management, in cooperation with the Office of Surface Mining Reclamation and Enforcement

1. Type of Action: Administrative (X) Legislative ( )

2. Abstract: The cumulative impacts of developing up to 24 coal tracts through four leasing alternatives in northwest Colorado and southwest and south-central Wyoming are analyzed. The four leasing alternatives propose offering for lease 101, 495, 759, or 991 million tons of coal recoverable by surface, subsurface, or in situ gasification mining methods. The significant, and unquantifiable but potentially significant, impacts to human and biological resources are analyzed by considering the impacts that existing and future growth and development in the region could have (baseline), together with the impacts of the four leasing alternatives. Impacts increase in number and magnitude as the amount of coal to be developed increases through the alternatives. However, the number and magnitude of impacts can be influenced by which of the 24 tracts are included in a particular alternative, except for the maximum leasing alternative, which includes all tracts to be leased.

3. The Draft EIS received a 60-day public review. Comments received during this review period have been incorporated into the analysis contained in this Final EIS. Comments were received from various individuals, organizations, and governmental agencies and are displayed in the Public Participation section of this volume.

4. For further information, contact:

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Little Snake Resource Area
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5. Date filed with EPA

Draft: August 8, 1983

Final

VOLUME 1

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(Incorporated by Reference*)

*The Table of Contents from Volume 1 is included here for ease of reference for the reader. For a specific analysis, see Volume 1 under the appropriate section.

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SUMMARY

The Environmental Impact Statement (EIS) analyzes the environmental impacts of the proposed competitive leasing of 24 Federal coal lease tracts in the Green River-Hams Fork Coal Region. This is the second round of proposed Federal coal leasing in the region.

As part of the Federal coal management program, the Department of the Interior, through the Bureau of Land Management, periodically conducts competitive coal lease sales to ensure that adequate coal supplies are available to meet national long-term energy requirements and to ensure that adequate reserves are available to continue existing production. In accordance with this program, on January 6, 1983, the Secretary of the Interior established a leasing level range of 750 to 950 million tons of recoverable coal for this second round of leasing in the Green River-Hams Fork Coal Region.

The Green River-Hams Fork Coal Region encompasses all or portions of Albany, Carbon, Sweetwater, Sublette, Lincoln, and Uinta counties in Wyoming and Routt, Moffat, Jackson, Grand, and Rio Blanco counties in Colorado. However, the proposed Federal leasing would affect primarily Carbon County in southcentral Wyoming, Sweetwater and Uinta counties in southwest Wyoming, and Routt, Moffat, and Rio Blanco counties in northwest Colorado.

Issues/Areas of Controversy

A preliminary set of issues and alternatives was presented to the public for review and comment in January 1983. No new alternatives or issues within the scope of the EIS were identified during the public scoping process, but existing issues were elaborated on, with concerns on specific areas or resource conflicts being raised. Major areas of concern or controversy raised during the public scoping period centered around the following issues: air quality, water quantity and quality, wildlife values, reclamation potential, land use (particularly impacts to ranching operations), wilderness/recreation areas, transportation of coal, economics, and social values.

A 60-day public comment period was held on the Draft EIS (August 8 through October 9, 1983). The majority of the comments dealt with the need for leasing, adequacy of baseline data, appropriateness of worst-case analysis, reclamation potential, and impacts to surface water and wildlife. Comments on surface water resulted in major revisions to the surface water sections, primarily salinity. The entire surface water section (Affected Environment and Environmental Consequences) has been reprinted in this volume. The remainder of the comments resulted in relatively minor text changes.

Other Actions

After release of this Final EIS, the Regional Coal Team will recommend to the Director of the Bureau of Land Management (1) which, if any, of the 24 tracts should be offered for lease sale and (2) if appropriate, a lease sale

schedule. The Director will, in turn, forward the team's recommendations, along with the Director's own recommendations, to the Secretary of the Interior. The Secretary will make the final decision on whether to lease tracts and, if so, which tracts are to be offered.

The Secretary's decision is not limited solely to the alternatives presented in this EIS. The decision could include changes in the proposed level of leasing, different tract combinations, alteration of tract boundaries, or changes in the lease sale schedule. In making the decision, the Secretary will consider not only the environmental analysis included in this EIS but also expressed preferences of the Governors of Colorado and Wyoming; recommendations of the Regional Coal Team; public comments; coordination with other Federal agencies; and technical, regulatory, and policy considerations.

On split estate lands where the surface is owned by a qualified surface owner, coal deposits that will be mined by other than underground mining techniques shall not be included in a lease sale without evidence of written consent from the qualified surface owner allowing entry and commencement of surface mining operations.

Alternatives

Five alternatives are addressed in this EIS: No Action, Low Leasing, Moderate Leasing, High Leasing (preferred alternative), and Maximum Leasing. The leasing alternatives include various mitigation requirements, which are considered part of the proposed Federal actions.

The No Action alternative would not offer for competitive leasing any of the 24 tracts, except for Little Middle Creek (in Colorado), which could qualify as an emergency bypass lease. However, even without new Federal leasing, activities could occur as a result of both coal actions (including some nonproducing leases and some preference right lease applications) and noncoal actions (including oil and gas, oil shale, trona, uranium, pipelines, etc.), natural population growth, and continuation of some existing operations. Taken together, these activities constitute the baseline, which is a projection of possible overall development until the year 2000 without any additional Federal coal leasing.

The Low Leasing alternative proposes the leasing of seven tracts--four in southwest Wyoming and three in northwest Colorado (including Little Middle Creek). The tracts include approximately 341.2 million tons of in-place coal reserves (both Federal and non-Federal), of which 101.1 million tons would be recoverable.

The Moderate Leasing alternative proposes leasing a total of 13 tracts--the 7 proposed under the Low Leasing alternative plus 1 additional tract in southwest Wyoming, 2 additional tracts in northwest Colorado, and 3 tracts in southcentral Wyoming. The 13 tracts include approximately 1,276.8 million tons of total in-place coal reserves, of which 495.3 million tons would be recoverable.

The High Leasing alternative proposes leasing a total of 19 tracts--the 13 proposed under the Moderate Leasing alternative plus 2 tracts in southwest Wyoming, 1 tract in southcentral Wyoming, and 3 tracts in northwest Colorado. The 19 tracts include approximately 1,935.2 million tons of total in-place coal reserves, of which 764.0 million tons would be recoverable. This figure falls within the Secretary's preliminary leasing level of 750 to 950 million tons of total recoverable coal, and this alternative is the preferred alternative.

The Maximum Leasing alternative proposes leasing all 24 tracts. This involves leasing 5 tracts in addition to those proposed under the High Leasing alternative--1 tract in southcentral Wyoming and 4 tracts in northwest Colorado. The 24 tracts include approximately 2,460.4 million tons of total in-place coal reserves, of which 995.4 million tons would be recoverable.

It should be noted that the Corral Canyon Tract has been exchanged. It is assumed that the tract will still be developed in private ownership. The exchange is now in litigation. In the event that the tract is returned to Federal ownership, it would be considered for leasing. Therefore, the impacts are left in the EIS as analyzed. There would be little, if any, difference in impacts whether the tract was made available by exchange or Federal leasing.

Major Conclusions

Analysis indicates that new Federal coal leasing would cause no significant impacts to the following resources under any alternative: climate, cultural or historical values, threatened or endangered species (on the tracts), flood plains, wetlands, prime or unique farmlands, areas of critical environmental concern (ACECs), wild and scenic rivers, wilderness areas, or wilderness study areas.

Resource categories which would incur one or more significant impacts from new coal leasing are air quality, geology/topography/minerals, water, vegetation, wildlife, recreation, visual resources, land use, economics (both beneficial and adverse), social values, and transportation.

Most of these resource categories would be significantly impacted under all four leasing alternatives, with overall impacts increasing in number and magnitude from the Low to the Maximum alternative as more tracts and greater total tonnages were incorporated. All impacts would occur under the Maximum alternative, since this alternative contains all tracts. The extent and magnitude of impacts on specific resources can be influenced by which of the 24 tracts are included in a particular alternative (except for the Maximum alternative). For example, certain tracts cause more impacts to particular wildlife habitats and species, others affect surface water quality in nearby areas, and still others create greater economic impacts.

No Action Alternative

The following significant impacts would result under the No Action alternative.

* Sulfate concentrations in Fish Creek by the year 2000: between 130 and 464 milligrams per liter (mean concentrations per month); low flow concentrations exceed Colorado Department of Health standards of 250 milligrams per liter. [northwest Colorado]
* Sulfate concentrations in Trout Creek by the year 2000: between 130 and 297 milligrams per liter (mean concentrations per month). [northwest Colorado]
* Salinity concentrations of 962 milligrams in the Lower Colorado River at Imperial Dam by the year 2000. [regional]
* Loss of approximately 220,000 acres of sagebrush habitat by the year 2000. [northwest Colorado and southwest Wyoming]
* Loss of approximately 310,000 acres of big game winter habitat by the year 2000. [northwest Colorado and southwest Wyoming]
* Loss of approximately 4,600 mule deer by the year 2000. [northwest Colorado and southwest Wyoming]
* Loss of approximately 940 elk by the year 2000. [northwest Colorado]
* Unquantifiable loss of riparian habitat. [southwest and south-central Wyoming]
* Decreased quality of aquatic habitat in Fish and Trout creeks. [northwest Colorado]
* Needs for capital improvements exceeding some communities' bonding capacities. [northwest Colorado]
* Insufficient housing in some communities. [northwest Colorado]
* Increased social stress in some communities. [northwest Colorado]

Low Leasing Alternative

The Low alternative would result in all of the above significant impacts, plus the following new impacts or increased impact levels:

* Alterations to topography. [Tract 98]
* Cumulative sulfate concentrations in Trout Creek by the year 2000 ranging from 134 to 304 milligrams per liter (mean concentrations per month). [Little Middle Creek and Middle Creek tracts]
* Slight unquantifiable increases in salinity concentrations in the Lower Colorado River at Imperial Dam by the year 2000. [Prairie Dog, Little Middle Creek, Middle Creek, Deadman, Leucite Hills, and Point of Rocks tracts, and Tract 98]
* Unquantifiable degradation of groundwater quality around the seven tracts included in this alternative.
* Slight decrease of quality of aquatic habitat in Trout Creek. [Little Middle Creek and Middle Creek tracts]
* Disturbance of raptor nests off-tract [Leucite Hills Tract]
* Unquantifiable losses of antelope. [Leucite Hills and Point of Rocks tracts]
* Increased tax revenues in Rio Blanco County, Colorado. [Prairie Dog and Middle Creek tracts]
* Insufficient housing at Rangely, Colorado. [Prairie Dog Tract]
* Increased social stress at Dinosaur, Colorado. [Prairie Dog Tract]
* Increased loss of life and property as a result of increased traffic accidents. [all seven tracts]

CHAPTER 5

PUBLIC PARTICIPATION

Introduction

Public involvement has been a key element in all of the steps leading to the publication of this environmental impact statement (EIS). Public involvement techniques have ranged from informal meetings to formal public hearings. In addition, numerous requests for specific information have been answered. The following list highlights public participation activities.

Land Use Planning Scoping Meetings

White River Management Framework Plan (MFP) amendment (1981-Denver, Meeker, Rangely, Grand Junction)
Williams Fork MFP amendment (1981-Craig, Denver, Steamboat Springs)
Divide/Overland Area management framework plan (MFP) Update (1982-Baggs, Saratoga, Rawlins)
Big Sandy MFP Decision (1981-Rock Springs)
Salt Wells MFP Decision (1981-Rock Springs)
Pioneer Trails MFP Amendment (1981-Kemmerer)

Public Meetings on DOE Production Goals

Denver, Colorado - January 5, 1982
Craig, Colorado - January 6, 1982
Rawlins, Wyoming -- January 12, 1982
Rock Springs, Wyoming - January 13, 1982

Regional Coal Team Meetings

Cheyenne, Wyoming - January 28, 1982; January 11 & 12, 1983
Denver, Colorado - March 31, 1981; June 16, 1982; October 13, 1982; October 20, 1983

Public Comment Period on Draft Coal Leasing Level Paper: October 13-20, 1982

Expressions of Interest

For various planning units within the three affected BLM districts - January 1982 through June 6, 1982

Scoping Meetings

Denver, Colorado: January 24, 1983
Rawlins, Wyoming: January 25, 1983
Rock Springs, Wyoming: January 26, 1983
Craig, Colorado: January 27, 1983

Public Hearings

Denver, Colorado: September 12, 1983
Rawlins, Wyoming: September 13, 1983
Rock Springs, Wyoming: September 14, 1983
Craig, Colorado: September 15, 1983

Public Comment Period

A 60-day public comment period on the Draft EIS was held from August 8 through October 7. The public hearings noted above were a part of this comment period; witnesses who testified at these hearings are shown in table 1. In addition, 29 comment letters were received (table 2).

Other Activities and Coordination

In addition to the activities listed above, many informal meetings were held for consultation purposes with various Federal, state, and local agencies. A broad range of one-on-one meetings have been held by the many Bureau specialists assigned to the project. The information received has been incorporated into the EIS as appropriate.

Formal consultation for the EIS comprised (1) consultation with the Fish and Wildlife Service under Section 7 of the Endangered Species Act of 1979 concerning nationally listed threatened or endangered species, and (2) consultation with the Colorado and Wyoming State Historic Preservation Officers under Section 106 of the National Historic Preservation Act. The Craig, Rawlins, and Rock Springs districts were responsible for carrying out these formal consultations for their respective areas. Results of these consultations are discussed in Chapter 3 under Vegetation, Animal Life, and Cultural Resources.

Distribution of EIS

Approximately 500 copies of the Draft EIS were sent to Federal agencies, state and local governments in the region, energy and mineral development companies, public interest organizations, universities, and numerous individuals concerned about the outcome of the coal leasing process.

TABLE 1

WITNESSES WHO TESTIFIED AT THE DRAFT EIS PUBLIC HEARINGS

	Speaker	Representing
Hearing:	Denver, Colorado, 12 September 1983, 1:30 p.m.	
	Purnee McCourt	Colorado League of Women Voters
Hearing:	Denver, Colorado, 12 September 1983, 7:00 p.m.	
	No witnesses present	
Hearing:	Rawlins, Wyoming, 13 September 1983, 7:30 p.m.	
	David Preston	Rocky Mountain Energy Co.
Hearing:	Rock Springs, Wyoming, 14 September 1983, 7:00 p.m.	
	Robert Johnson	Attorney for Salt Wells Ranch
	Craig Thompson	Self
	Steven Crowley	Self
Hearing:	Craig, Colorado, 15 September 1983, 7:00 p.m.	
	No witnesses testified	

TABLE 2

COMMENT LETTERS RECEIVED
ON THE DRAFT EIS

Letter No.	Sender
1	Continental Divide Trail Society
2	Robert H. Johnson, Attorney at Law
3	Ark Land Company
4	Daryl Anderst
5	League of Women Voters of Colorado
6	Western Fuels Association, Inc.
7	NERCO Coal Company
8	Empire Energy Corporation
9	Chris Plant
10	Trapper Mining Inc.
11	Colowyo Coal Company
12	Getty Oil Company
13	Natural Resources Defense Council, Inc.
14	Sierra Club Southwest Office
15	USDI, Fish and Wildlife Service
16	Energy Fuels Coal, Inc.
17	National Wildlife Federation
18	Governor, State of Wyoming
19	Rocky Mountain Energy
20	Colorado Department of Natural Resources
21	Tower Resources, Inc.
22	Wyoming Wildlife Federation
23	Craig Thompson

TABLE 2
(continued)

COMMENT LETTERS RECEIVED
ON THE DRAFT EIS

Letter No.	Sender
24	USDI, National Park Service
25	Black Butte Coal Company
26	Powder River Basin Resource Council
27	John R. Swanson
28	Bureau of Reclamation
29	U.S. Environmental Protection Agency

Federal Agencies

Advisory Council on Historic Preservation

Department of Agriculture
  Forest Service
  Soil Conservation Service

Department of Energy

Department of Housing and Urban Development

Department of the Interior
  Bureau of Mines
 *Bureau of Reclamation
 *U.S. Fish and Wildlife Service
  U.S. Geological Survey
 *National Park Service
  Office of Surface Mining (cooperating agency)

Department of Transportation

*Environmental Protection Agency

*State Agencies

Distribution of the Draft EIS to appropriate state agencies was handled by the state clearinghouses (Department of Natural Resources in Colorado and State Planning Coordinator's Office in Wyoming).

*Responded with written comments

Responses to Comments

All letters and testimony commenting on the Draft EIS were reviewed and considered by the EIS Team in preparation of this Final EIS. Comments which presented new data, questioned facts or analyses, and raised questions or issues bearing directly upon the EIS were fully considered and evaluated.

The majority of the comments dealt with the need for leasing, adequacy of baseline data, appropriateness of worst-case analysis, reclamation potential, and impacts to surface water and wildlife. Comments on surface water resulted in major revisions to the surface water sections, primarily with regard to salinity. The entire surface water section (Affected Environment and Environmental Consequences) has been reprinted in this volume. The remainder of the comments resulted in relatively minor text changes (see Errata and Text Changes in this volume following responses to comments).

Comments which discuss material outside the scope of this document are reproduced but not responded to. In instances where a comment has been made by more than one commentor, the comment has been answered once and that response is referenced in the other comments. If a letter enclosed extensive additional support material, that material was reviewed during preparation of the Final EIS, but it has not been reproduced in the EIS.

It should be noted that the public hearing and comment letter concerns overlapped considerably; only two concerns not covered in the letters occur in the hearing transcripts. They are responded to separately after the comment letters.

Continental Divide Trail Society

P.O. BOX 30002 BETHESDA, MD. 20814

September 6, 1983

Carol MacDonald, Team Leader
Bureau of Land Management
Little Snake Resource Area
P.O. Box 1136
Craig, Colorado 81626

Dear Ms. MacDonald:

This letter responds to the invitation for comments on the Green River - Hams Fork Region DEIS. We note that the Secretary's decision is not limited solely to the alternatives presented in the DEIS. We accordingly propose that the moderate leasing, high leasing, and maximum leasing alternatives be modified to exclude therefrom leasing of the Atlantic Rim tract.

The information that is contained in the DEIS it itself provides sufficient grounds to warrant deferral of leasing. Indeed, we are struck by the number of key characteristics that are adversely impacted at Atlantic Rim alone. Leasing there may result in unavoidable landsliding and, because of the steepness of slopes, reclamation will be impractical or at best difficult; and even if reclamation can be accomplished, valuable riparian and aspen habitats would probably be irreplaceable. Moreover, aspen loss and other factors may have a significant impact on the viability of the Baggs elk herd; this is in addition to the losses that would be suffered by eagles, hawks, and sage grouse. The Atlantic Rim tract, unlike any other, would be scarred so badly that its visual resource classification would have to be reduced from its present high quality scenic status.

In our view, the information contained in theDEIS is insufficient to arrive at a judgment about the above impacts and, in particular, about the potential loss of springs and surface water flows.

Our primary concern, however, is the failure to give adequate consideration to historic and recreational resources. Just below the Atlantic Rim lies the Overland Route through Bridger Pass that became a major avenue for westward migration after travel on the Oregon Trail became too hazardous. Specifically, what is the status of this area, and of its principal features, under the National Historic Preservation Act? Isn't Bridger Pass listed on the National Register? Would leasing of the Atlantic Rim tract 1-1

1-1
The intact portions of the Overland Trail are considered by both BLM and the Wyoming State Historic Preservation Officer (SHPO) to be eligible for inclusion on the National Register of Historic Places (NRHP). Bridger Pass is listed on the NRHP. The nomination to the NRHP for the Sulpher Springs Stage Station was prepared but not submitted to the keeper of the NRHP because of objections by the private landowner. It was determined during BLM's land-use planning process that the Overland Trail segments and the Washakie Stage Station Site are unsuitable for surface mining and for surface operations and impacts associated with subsurface mining. In addition, a 1,320-foot buffer zone along either side of the trail segments and around the stage station site was determined to be unsuitable for any intrusions that would be visible from the trail segments or the stage station.

Carol MacDonald September 6, 1983

directly or indirectly affect historic resources listed on the National Register or eligible for listing? What mitigation measures will be employed?

The DEIS refers at 174 to the Continental Divide Trail. It should be noted, first, that the Trail has been designated a national scenic trail and is thus not "proposed" as stated in the document. Second, the scenic impacts may be more severe than suggested by the DEIS, especially if the CDNST were to be located along the headwaters of Separation Creek. (See Wolf, Guide to the Continental Divide Trail, vol. 4 at 21-22.) Third, the availability of water from flowing springs is of prime importance for hikers in semiarid country; and spring losses in the Bridger Pass area could be devastating to them. Fourth, how will mine traffic be routed and how will such traffic affect the outdoor recreation experience along the Trail? 1-2

In light of the foregoing, leasing in the Atlantic Rim tract should be eliminated, or at least deferred until such time as planning can be considered in conjunction with the development of the Continental Divide National Scenic Trail, and with participation by all interested parties. The Atlantic Rim represents a high potential historic site and a high potential route segment which merits protection under Section 5(f)(3) of the National Trails System Act, as amended by P.L. 98-11.

It may be that mitigating measures would suffice to preserve the water and scenic attributes. But the historic and recreational values of the area must be recognized and taken into account and if effective mitigation is not to be assured, then the Atlantic Rim tract should not be leased.

Sincerely,

James R. Wolf
Director

Development of the Atlantic Rim Tract would directly and indirectly affect historic and prehistoric sites eligible for inclusion on the NRHP, but the procedures established by both Federal and state regulations will ensure that any adverse effects are mitigated before any development. See letter 18 from the Wyoming SHPO, which concurs with this position.

1-2
The text has been changed to clarify that the Continental Divide Trail is a designated national scenic trail but that the route through the area has been proposed and is not yet established. See Text Changes section (p. 174 entry). It is probable that the Atlantic Rim Tract would be visible from the area around the headwaters of Separation Creek. Since any disturbed areas would be at a distance of about 2 miles, a buffer zone would exist to aid in diminishing the visual impact. A detailed analysis is not possible without investigating the exact route, physical barriers, alternatives, etc., which is beyond the scope of this EIS.

There would be no loss of spring water in the immediate Bridger Pass area due to coal leasing.

The recreation setting in this area allows motorized forms of recreation opportunities due to the numerous roads throughout this area. The 20-mile Road would probably be upgraded to provide access for the Atlantic Rim Tract and a rail spur constructed near this road. The route would probably cross the Continental Divide at or near a point where five existing roads meet as well as following the 20-mile road route that runs along or near the Divide for approximately 5 miles. The recreation setting would thus change as a result of increased traffic and the introduction of a railroad. However, even though some recreation experiences may change as a result, the change would not be significant because motorized forms of recreation now exist and would remain in this area.

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2

September 14, 1983

Ms. Carol MacDonald, Team Leader
Bureau of Land Management
Little Snake Resource Area
P. O. Box 1136
Craig, Colorado 81626

Re: Green River-Hams Fork EIS

Dear Ms. MacDonald:

STATEMENT FOR PUBLIC HEARING ON
GREEN RIVER-HAMS FORK EIS
Rock Springs, Wyoming, Sept. 14, 1983

This statement is submitted on behalf of Mr. Carl Uncapher, owner and operator of the Salt Wells Ranch, southeast of Rock Springs, in Sweetwater County, Wyoming. This ranch has deeded land adjacent to the proposed Pio Tract, which is listed as considered for coal mine development under the High alternative considered under the EIS.

Development of the Pio Tract under the coal mining proposal would have severe adverse effects on the Salt Wells Ranch. Some of these have been addressed, but not answered, in the EIS. In addition, the Salt Wells Ranch will also be adversely affected by coal mine development of the Bean Springs preference right lease, a short distance from the Pio Tract, and the cumulative effect of the two developments has not been seriously reviewed in the present EIS or in the EA on the Bean Springs project. In fact, the Bean Springs EA expressly stated that the cumulative effect was not included in the report because it would be considered in the EIS on the Pio Tract.

The EIS has only a brief mention of the Bean Springs project, no detail, and only limited discussion on the cumulative effects of the two projects on the Salt Wells Ranch or other areas. The EIS is deficient on that count alone.

The EIS does point out a number of alarming detrimental effects

of coal mine development on the areas involved; it points out further the drastic consequences to a number of ranches, including the Salt Wells Ranch. And yet the report ignores these detrimental effects, cited in some cases as irreversible, and recommends the High impact alternative.

Some of the detrimental effects cited in the report are:

Page 131: "All of the proposed tracts in Wyoming are considered to have low reclamation potential. The low potential of these sites causes difficulties in re-establishing vegetation communities, so reclamation of these tracts is problematic."

Page 131: "All of the tracts in Wyoming * * * * * lack adequate topsoil material. Thus there is limited suitable topsoil for a plant growth medium. In some cases, suitable overburden may be used as a replacement; if not, topsoil must be hauled in."

Page 133: "Although the reclamation procedures currently required in Wyoming and Colorado appear adequate to restore original production levels, many problems remain that require additional research. The goals for successful reclamation are basically two-fold. The goal of short-term reclamation is to stabilize soils and topographic features to minimize erosion or other losses of topsoil substrata. The bulk of the research that has been accomplished has focused on this goal. The longer-term goal of establishing a vegetation community capable of supporting premining land uses and possessing the capability of renewing itself under natural conditions is much more difficult to accomplish. More research is needed on this long-term reclamation process. Because more research is needed, the long-term stability of the reclaimed environment is still largely unknown. The permit application package will have to address the special problems discussed for the various tracts in this section." (emph. supp.)

Page 131: "The average annual precipitation for Wyoming tracts is approximately 7 to 9 inches. * * * * * As a rule of thumb, approximately 10 inches of precipitation are necessary to sustain revegetation attempts."

Page 122: "All animal unit months (AUMs) available within

the tract boundaries of a surface mine would be out of production until end of mine life."

Page 175: "It generally requires 20 to 50 years for natural vegetation to re-establish to the point where all elements of the original landscape (line, form, color, and texture) are attained and the area appears as it did before it was altered."

Page 148: "Leasing and mining * * * * * would unavoidabley result in the local removal of part of certain aquifers."

"A cumulative total of 13,800 acres of acquifers would be removed and replaced in Wyoming."

Page 150: "Resaturation of the spoils acquifers could take 50 to 100 years."

"Most impacted springs would probably be permanently impaired."

Comment: In spite of the above findings, set forth in the EIS, the EIS recommends the "High" development alternative of the coal tracts studied. It in effect has decided that it does not have the answers to the problems, that in fact the problems cannot be answered, but that it will proceed anyway with the "High" alternative rather than on a limited basis pending resolution of the many problems.

On the findings of the EIS for the Pio Tract, the report notes on page 241 that "A large part of the Pio Tract is used by mule deer as winter range."

On page 241: "Reclaimability of disturbed areas in the tract is limited due to climatic conditions and poor soil properties. * * *

"Loss of AUMs has been determined to be a significant issue. This loss could have a significant effect on the viability of the affected cattle operation."

Amazingly, the report lists "Change in use of approximately 2,700 acres of land from livestock grazing to mineral development for the entire life of the mine" as a "short-term impact" (Page 241).

Even more amazing, the report lists as long-term impacts, on

page 242, a return of the 2,700 acres to forage production at a level equal to, if not better than, the production prior to development, and a return of wildlife habitat to equal to or better. It does not explain how this is to be accomplished in the face of the statements cited hereinabove, which virtually rule out any restoration of vegetation as being not possible. An examination of existing old surface mine sites in Sweetwater County would confirm this. 2-1

Even the newer surface mine sites in Sweetwater County, presumably developed with more modern reclamation techniques in effect, have had poor results in surface reclamation, as noted in the Pio Tract Profile issued September, 1982. Table 2 of the report, referring to possibility of revegetation, states "The nearby Jim Bridger mine has the worst success rate of 10 mines in Wyoming."

Comment: Since the report lists End of Mine Life as being some time after the year 2000 (Page 121), and says reclamation would not be accomplished until another 12 years (Page 122), it is difficult to see how change in use of the Pio acreage to mining "for the entire life of the mine" could be seriously labelled as only a "short-term" impact. Even other portions of the report discuss this as an impact of long-range consequences. 2-2

Consequences to the Salt Wells Ranch

The EIS sets forth a number of severe effects that development of the Pio Tract would have on the Salt Wells Ranch. Among the comments are:

Page 179: "Impacts to individual ranching operations would be significant under the High and Maximum alternatives. The threshhold for significance is assumed to be 10 percent or more of one's total operation. With the leasing of the Pio Tract under the High alternative, in combination with the existing Bean Springs PRLA projected for future development, the Salt Wells Livestock Company stands to lose 16 percent of their operational AUMs."

Page 183: "The conversion of ranch lands to mining uses and the loss of AUMs associated with this conversion would force two individuals out of business under the High and Maximum alternatives. The leasing of the Pio Tract under the High and Maximum alternatives would result in a 16 percent loss to

2-1
The major objective of the Reclamation section is to identify potential problems which could occur as a result of each alternative. These problems must be addressed in the permitting process before actual mining takes place. Reclamation potentials of each tract were determined based on the number of problems associated with each specific tract (page 132). We are not saying that areas having low reclamation potential cannot be reclaimed; however, these problems must be addressed and dealt with during the permitting process. Mitigation measures exist in Office of Surface Mining, Mined Land Reclamation Board (Colorado), and Department of Environmental Quality (Wyoming) regulations.

2-2
Assumptions and guidelines concerning short-term and long-term impacts may be found on page 121. For simplicity, the EIS used the approach of taking the entire tract out of production at the start of mining and returning it to production at the end of mining. Of course, some existing land uses would continue during mining, while a part of each tract could remain out of production after end of mine life; these would, to some extent, offset each other. Our method does tend to overestimate the impacts associated with the change of land use; this can occur when a worst-case analysis is used.

one operator. * * * * *"

"Irreversible commitments of existing land use resources would involve the loss of the two ranching operations under the High and Maximum alternatives. The owners of these operations may be forced to seek other employment during the life of the projects. The probability of the ranchers ever re-establishing their operations after 20 to 30 years is questionable."

Page 211: "In several instances, however, the precise locations of individual ranches relative to proposed coal tracts could have drastic consequences for these particular ranches. A particular problem exists regarding a long-time ranch near the Pio Tract."

Page 241: "Loss of AUMs has been determined to be a significant issue. This loss could have a significant effect on the viability of the affected cattle operation." (In reference to the Pio Tract).

Thus, the EIS has in effect written off the Salt Wells Ranch, one of Sweetwater County's oldest ranching operations, as a national sacrifice to the development of a coal mine of questionable economic viability.

Furthermore, the EIS offers no hope to the Uncapher family for mitigation of the loss. On page 178 the report cites the authority of the BLM to curtail or temporarily suspend AUMs to allow the coal development. It points out this loss would not result in compensation, and that for the federal leases the Salt Wells Ranch would not receive compensation for the loss.

The report, while conceding the 16 percent loss of grazing, fails to address the economic effect that a 16 percent loss will have on any business operation, whether it be a ranch, a coal mine, a railroad, or a grocery store. But it does appear to recognize that this loss could mean an end to operation of the ranch, through the reduction in grazing capability. On page 198 the report lists the loss to the Salt Wells Ranch of $15,000 per year. This apparently is based upon the grazing acreage lost, but it does not consider the effect the operation of a coal mine would have on the rest of the ranch. This is the effect only of loss of grazing. There are other

losses, also, not included in that figure.

The report does, for example, note the loss of water, but it does not address adequate mitigation of that loss. It does admit that 13,800 acres of aquifers would be removed in Wyoming (Page 148); that "resaturation could take 50 to 100 years after completion of mining" (Page 148); that "most impacted springs would probably be permanently impaired" (Page 150); and that "water levels in the affected aquifers would be lowered in the vicinity of the mines." (Page 150). 2-3

In the case of the Pio Tract, the Salt Wells Ranch has a reservoir adjacent to the tract. The spring which feeds the reservoir lies on the Pio mining acreage. Loss of this spring and reservoir, which the report concedes would happen, would be equally as detrimental, if not more so, to the ranch than the loss of the grazing acreage. Yet the report does not consider the impact of this loss, nor does it offer a solution. 2-4

In fact, the report brushes off the the effects of mining on the groundwater supplies of the entire area, as being "not known," and then decides the effect would be "minor" during the period of active mining "and should become locally signficant only after completion of mining and reclamation."

How can it logically be stated that the loss of ground water supplies, in an area where groundwater is the basic source, would first be "unknown," then "minor," then "significant only after completion of mining and reclamation" (Page 152)? On Page 121 the report lists "End of Mine Life" as sometime after the year 2000, and on page 148 states "resaturation" of the aquifers could take 50 to 100 years. To a rancher the impact of cutting off a spring is significant and serious the instant that spring is cut off. He does not need to wait until the end of mine life, some 20 to 30 years, to realize that the economic viability of his ranch is affected drastically and his way of life irretrievably damaged. 2-5

There are other drastic consequences in the area of water damage alone which bear further study and exploration. While there are many listed, only one need be cited: On page 150, the report refers to the effect that coal mining and the spoils materials would have on "perching layers" of water, with a detrimental result of depriving vegetation along the valley slopes of water. This is vegetation off the mined tract, a result over and above the 2-6

2-3
All the permitted water uses dependent on the 13,800 acres of aquifers potentially removed in Wyoming would have to be settled according to local, state, and Federal laws before mining took place. Specific needs and possibilities for mitigation would be identified at the mine permit application stage when a definitive mine plan, including appropriate site-specific hydrologic data, would be available. A mining permit could not be issued if the operation could not satisfy the environmental performance standards of the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and the implementing regulations.

2-4
The reservoir mentioned is only partially located on private land; approximately 75 percent of it is located on Federal land administered by BLM. The Pio Spring, which apparently once fed this reservoir, was examined a few years ago by a BLM engineer; at that time, there was no flow from the spring and no evidence that it had flowed for several years prior to his inspection. Loss of the spring, therefore, could not occur from coal mining because it apparently ceased flowing several years ago. What water the reservoir currently gets must come from some other source, most likely surface runoff during wet months.

2-5
The statement you refer to is a summary conclusion under Unavoidable Adverse Effects. The supporting analysis for these conclusions can be found under Groundwater (Volume 1, pages 148-150).

2-6
There would be a reduction in vegetative production; however, given the size of the area affected, the loss is considered to be an insignificant impact and would not measurably contribute to a cumulative impact.

loss of the grazing acreage involved.

There are so many problem areas cited in the EIS, with no solution offered, that the only conclusion which can be drawn is that further study of the consequences of coal mining need to be conducted, and that further studies of how to alleviate these consequences are mandatory. The economic viability of the proposed coal mining projects needs to be re-assessed against the background of the many problems cited in the report.

In addition, there needs to be addressed the vital question of what the Federal government can, or will, do to enforce mitigation of the drastic consequences to the ranchers who could be driven out of business by the coal leasing program. The Carl Uncapher ranching operation is one of these, and it is no answer to families such as this to tell them that in 20 to 30 years they can return and pick up their ranching operation where they were cut off. If this mining is allowed to proceed, ranching families such as the Uncapher family need and are entitled to more than the cold "sympathy" offered in the EIS of "find another job." 2-7

If the Federal government can afford to lease out its coal deposits to private industry, and in so doing drive out the rancher who has depended on that grazing land for part of his livlihood, then the Federal government can also afford to compel that private coal operator to reimburse the rancher for his loss.

If the Federal government is not willing to compel the coal mining company to compensate the rancher for his loss, then it should not lease the federal coal tract.

Mr. Uncapher has tried to negotiate with the potential coal lessee involved, with no results. The first response was "wait until we get the lease, then we'll talk." The next response of the coal company was in effect, "ok, if you insist, we'll negotiate, but only on our terms." The next and last response, to an offer, was simply "no".

Respectfully submitted,

Robert H. Johnson

Robert H. Johnson

RHJ:sn
CC: Carl Uncapher
Honorable Robert F. Burford, Director, BLM
Maxwell T. Lieurance, Wyoming State Director, BLM
Donald A. Sweep, Rock Springs District Director, BLM

2-7
Grazing permits or leases convey no right, title, or interest held by the United States in any lands or resources. Permits or leases are issued subject to the possibility that the land may be devoted to a public purpose which precludes grazing prior to the end of the permit or lease. Land use planning decisions may result in grazing permits or leases being modified, suspended, or canceled (43 CFR Part 4130). The permittee or lessee is thus not entitled to compensation for loss of grazing privileges on public lands because of a change in the use of those lands. Tangible improvements owned by the permittee or lessee could be either replaced or compensated for.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Game and Fish Department

CHEYENNE, WYOMING 82002

W. DONALD DEXTER
DIRECTOR

October 5, 1983

EIS 493/L5
BLM Green River/
Hams Fork Coal
Round II Leasing
Draft EIS

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Mr. Dick Hartman
State Planning Coordinator
2320 Capitol Avenue
Cheyenne, Wyoming 82202

Attention: Mr. Warren White

Dear Mr. Hartman:

We are disappointed in the presentation of the impacts, based on an extensive, arbitrarily defined "region." The extent of real impacts on the terrestrial wildlife resource is masked by the size of the region delineated, and analysis of these impacts is rendered meaningless. In our March 28, 1980 letter to Dick Hartman, we objected to the "regionalization" of impact analysis. Our position has not changed. We suggest impacts to wildlife should be considered on a herd unit basis, not by "region". We do not agree with this regional analysis of impacts, and recommend that it be revised to include site specific analysis.

The Atlantic Rim Tract is the only proposed lease area which presents significant concern to Fisheries Resources. This concern is due to the tract's proximity to Muddy Creek.

Game Fish (brook trout) are limited to the reaches of the stream upstream from the tract, and some of its tributaries. The only species which have been collected in the vicinity are roundtail chubs, flannelmouth suckers, and speckled dace. Both the roundtail chub and the flannelmouth sucker are considered uncommon by the Wyoming Game and Fish Department and have been given a high research/management priority to maintain or increase current population levels (Current Status and Inventory of Wildlife in Wyoming, Wyoming Game and Fish Department, July 1977). Consideration for the presence and status of these species should be given when making any leasing and development decisions. 18-1

We do not anticipate any significant impacts on fisheries resources will occur from the development of any of the other tracts for Round 2.

Specific comments on the text of the DEIS are as follows:

a. P. 30, Tables 2-16 through 2-22 - Identified wildlife impacts are listed in the [illegible]

18-1
We apologize for the oversight on the flannelmouth sucker and the roundtail chub. The bluehead sucker is also present in Muddy Creek downstream from the Atlantic Rim Tract (Wyoming Fishes, Baxter 1970) and was given the same management/research priority in your 1977 publication. We agree that consideration for the presence of these three species should be given when making leasing and development decisions.

The habitat recovery and replacement plan required of the lessee prior to permit application package approval would cover impacts to these species. In addition to the habitat recovery plan, we believe the mitigation measures in the Water Resources section will go a long way towards preventing changes which could negatively affect the three sensitive fish species in the portion of Muddy Creek below the Atlantic Rim Tract.

Wyoming Game and Fish data indicates that these species are not found in the lower portion of Muddy Creek (Wiley 1977). This appears to indicate that a habitat gradient occurs in Muddy Creek and that, with some research, perhaps some of the important habitat parameters of these fish could be delineated. Very little is presently known of their habitat requirements, and additional information might help predict impacts and aid in recovery of these fish. We suggest that the possibility of research on Muddy Creek be pursued by the Wyoming Game and Fish Department with the idea of delineating the distribution and habitat requirements of these species of concern.

confusing and serves to visually minimize the predicted impacts. No distinction is made between defined negative and positive impacts. The tables are of limited value as an "at a glance" summary of impacts for each alternative.

b. P. 70, Conifer Vegetation Types - Unlike other conifer types mentioned in this section, ponderosa and limber pine often have substantial shrub understory with high value to wildlife. Habitat loss analyses would be more accurate if these two were treated as a separate type or included with the pinyon/juniper woodland. 18-2

c. P. 78, Game Birds - It should be noted that Columbian sharp-tailed grouse occur in Wyoming. Their status is currently listed as rare. 18-3

d. P. 79 - As we have noted above, impacts to wildlife have been artificially lumped in this EIS, thus we have no way of knowing if the population data presented is correct. Post-hunt 1982 population estimates for all big game herd units are available from our office upon request.

e. P. 82, Threatened and Endangered - There should be some mention in this section of the species listed by this Department as "rare" within Wyoming. 18-4

f. P. 121-122, Analysis Assumptions and Guidelines - #10 - We doubt that sites within Wyoming will be fully reclaimed in 12 years. For example, sagebrush often takes at least 15-30 years to re-establish to pre-disturbance levels. At what point of vegetative re-establishment has reclamation been accomplished? 18-5

g. P. 121-122, Analysis Assumptions and Guidelines - #12 - Since almost all tract summaries in Appendix 2 note a return to wildlife habitat as a land use, we assume that if these habitats have not been restored, then reclamation cannot have been successful. For example, if Atlantic Rim were mined but not returned to conditions able to support wintering elk, then there is a permanent loss, despite reclamation attempts. Further, the DEIS also assumes that all nonfederal lands in the tracts will be returned to prior uses (i.e., livestock grazing and wildlife habitat). There are no assurances this will occur, and the DEIS does not evaluate any scenarios where this would take place. Wildlife losses could then be extremely greater than that depicted. 18-6

h. P. 154, Vegetation - Mining impacts on vegetation are summarily dismissed with the assumption that reclamation will be completely successful.

i. P. 158, Unavoidable Adverse Effects; Short-term vs. Long-term; Irreversible Commitments - All three sections indicate that mining would adversely impact locally scarce vegetation on steep slopes. We agree, and suggest that this conclusion contradicts the stated assumption that reclamation will be successful. We believe that if the potential for reclaiming 18-7

18-2
The occurrence of ponderosa and limber pine in the region is extremely limited and could not be mapped as a separate type. Analysis of the loss of the conifer-type in terms of wildlife habitat has been analyzed in the Wildlife section. Since the impacts to the conifer-type are minimal, this level of detail was not considered necessary.

18-3
This has been added to the EIS. See the Errata section (p. 78 and p. 79 entries). Thank you for the information.

18-4
Except for four of the species listed as "rare" in Wyoming, "rare" species (1) have been discussed because they are also threatened or endangered species or (2) have been omitted because they do not occur in the Green River-Hams Fork Coal Region. The remaining four--meadow jumping mouse, scrub jay, western smooth green snake, and bluehead sucker--are not specifically discussed in the EIS. However, these species were considered during land use planning and were not carried forward since they would not be adversely affected by proposed coal leasing.

18-5
We realize that the amount of time required for complete reclamation varies, depending on a number of factors. It is for this reason that the loss of wildlife habitat (mountain shrubs, aspen, and fir) is shown as an impact, since premining vegetation communities would not be available for wildlife after mining. Requirements which must be met for bond release do not dictate that pre-existing serial stages have to be established; the community simply has to have the same stem counts, production levels, and "potential" as premining conditions.

18-6
Reclamation (as required by law) can be successful without taking into account supporting wintering elk. Developing scenarios to evaluate different land uses is beyond the scope of this EIS. The EIS assumes that postmining land use will return to premining land use (Volume 1, page 122, #11). Please also see responses to comments 13-10 and 26-15.

18-7
The EIS has highlighted these steep slopes as a potential problem or significant impact. A developer may meet the requirements needed for successful reclamation without establishing the same scarce vegetation which existed on these steep slopes. It is up to the decisionmaker (Secretary) to make the final decision, based on our analysis.

a tract to pre-mining land uses is seriously limited, then it should not be leased.

j. P. 161, Sagebrush - The statement that sagebrush habitat loss in the South-Central Wyoming ES will not affect big game populations because of available adjacent habitat is incorrect. In many big game herd units, we are currently very near population objectives. The loss of large acreages of sagebrush habitats in some specific locations could have significant impacts. 18-8

k. P. 239, Byrne Creek - It should be noted that a coal gasification project is proposed for 1985 immediately adjacent to this tract. This fact may alter the present analysis and present logistical problems in the mining of the tract as given in the EIS. 18-9

l. P. 279, Appendix 6 - Byrne Creek should be included in the list of five tracts with special mitigation considerations because this mine area will envelope the creek bottom and associated riparian habitat. Restoration to pre-mining conditions will be extremely difficult without strong reclamation stipulations. 18-10

We are also seriously concerned about the leasing alternatives presented in in this DEIS. We have provided, in cooperation with the USFWS, a tract ranking scheme for this region. In the case of at least one tract, Atlantic Rim, this ranking seems to have been ignored. The Atlantic Rim tract is included in all but the No Action and Low Leasing Alternatives. In our previous comments, we stated our opposition to the leasing of this tract (see our letter to Dick Hartman, January 7, 1983) unless mitigation for the loss of critical habitat could be provided. We remain committed to this position. We are very concerned with the leasing of the Atlantic Rim and N.E. Cow Creek tracts unless adequate wildlife mitigation can be demonstrated.

Please forward these comments to the appropriate federal agencies and contact us if we may be of further help.

Sincerely,

Francis Petera

FRANCIS PETERA
ASSISTANT DIRECTOR
OPERATIONS
WYOMING GAME AND FISH

FP:HBM:blg
cc: Game Division
Fish Division

18-8
The loss of large sagebrush habitat in some specific locations could have an impact on some big game populations. The statement in the EIS is a general statement directed toward all of south-central Wyoming. In the next paragraph in the EIS, we state that the loss of sagebrush habitat "could be particularly important in Wyoming with the leasing of Atlantic Rim and Corral Canyon tracts...."

18-9
A coal gasification project is presently proposed that would affect private portions of the Byrne Creek Tract (T. 16 N., R. 118 W., sections 15 and 21). The companies involved in this project are planning to initiate an exploration project on the area during the winter months of 1983. The companies are working with Synthetic Fuels Corporation and are in phase 2 of their analysis. At present, it is too early to speculate on the proposal's success, so it will not be added to the present analysis.

If the gasification project is approved, no logistical problems are expected. The areas of interest for the gasification project are below stripping depth, and the private interests involved are pursuing agreements to allow mining and the gasification project to occur simultaneously.

18-10
The requirement for a hydrologic mitigation study (page 279 of Volume 1) has now been applied to the Byrne Creek Tract (in fact, to all Wyoming tracts). See Text Changes section (pp. 278 and 279 entry).

A second measure pertains to raptor nests and associated buffer zones. The Byrne Creek Tract originally had an adjacent prairie falcon nest and buffer, but this portion of the tract was dropped from possible leasing. Therefore, this measure does not apply.

The measure concerning wildlife habitat recovery will be applied to the Byrne Creek Tract. See Text Changes section (pp. 278 and 279 entry).

THE STATE OF WYOMING

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September 22, 1983

MEMORANDUM

TO: Dick Hartman, State Planning Coordinator

FROM: Louis E. Allen, Water Resources Engineer LEA

SUBJECT: State Identifier No. 83-128, Green River/Hams Fork Coal Round #2 Draft EIS, BLM, August 1983.

I have reviewed the subject DEIS for water-related material pertinent to Wyoming. The water resources sections are for the most part confusing and contradictory, and do not facilitate brief and concise comments.

The surface water portions need to be reworked, including the treatment of surface water quality. The ground water portions seem to be adequate, in view of the fact that there are no site specific plans to consider. Wyoming water law needs to be considered, including the compacts and U.S. Supreme Court Decrees that affect what can and cannot be done. There needs to be more emphasis on protection of water rights - those water developments and uses that are under Wyoming State Engineer permits - for both surface and underground waters.

In the treatment of Colorado River salinity increases under the No Action alternative and as a base beyond which impacts from the proposed Federal coal leasing would occur, there is no consideration - or mention - of the Colorado River Water Quality Improvement Program. This is ongoing, and is directed at reducing salt loading to the system so that the salinity will remain at or near 1972 levels as future beneficial uses come on line. The Colorado River Salinity Forum is also active in this area. Specific comments follow. 18-11

1. The USGS stream gaging stations discussed should be identified by station number to facilitate reference and to help the authors keep track of the points on the streams they are referring to. Some stations listed by name only have been discontinued, but are used as though they are currently active. 18-12

18-11
Reference to the Colorado River Water Quality Improvement Program, which was inadvertently edited out from an earlier draft, has been added (Text Changes section). The effects of this program are reflected in tables 4-7A through 4-11B, which can be found in the Text Changes section.

18-12
USGS stream gaging identification numbers were left out of the text for simplicity and ease of reading. The tables should have had the station numbers, but some were inadvertently left out. These have been added, and discontinued stations have been deleted. See revised tables 4-3 through 4-11B (Text Changes section). The discontinued stations have not been used in the analysis.

2. The four river basins defined on page 57, and shown on the map, as the basins referred to in the analysis do have USGS station numbers given in Table 3-9, page 61. However, these basins omit several of the Wyoming tracts addressed in the DEIS. The entire Blacks Fork and the entire Little Snake River drainages are omitted by the chosen Green River and Yampa River stations. I fail to see any rationale for selecting the North Platte River at Orin station, when the North Platte River at Alcova (06642000) is available with over 45 years of record. 18-13

3. In Table 3-9 the flow data, 969,800 ac-ft/yr, for Green River near Green River, Wyoming (09217000) is the discharge for water year 1979, whereas the 28-year average at the station is 1,234,000 ac-ft/yr through water year 1979. Suspended sediment is shown in Table 3-9 as 681,239 ton/yr, but the cited reference gives 68,123.9 tons for 1979. This would reduce the sediment yield figure to 0.01 tons/ac for water year 1979. The Table shows a value of 546 for specific conductance, but the cited reference gives a mean value of 561. In this same Table, Colorado stations are reported for water year 1980. Water year 1980 had a discharge at station 09217000 of 1,334,000 ac-ft. A similar comparison could be made for the North Platte River at Orin. The data for Wyoming for 1979 are not comparable with Colorado data for 1980. If a single year's data are to be used for some reason, the same year must be used at all stations considered. Likewise, when averages are used, the same period of record should be used at all stations. 18-14

4. Page 62, Sediment Yield. The division process set forth here for sediment yield is in error. The annual suspended sediment load in tons should be divided by the basin acreage to get sediment yield in tons/ac/yr. The 0.03 tons/ac/yr minimum value shown should be changed to 0.01 tons/ac/yr (see comment 3). Why is bed load ignored? 18-15

5. Page 62, Water Use. The approach described here may be valid, but the last sentence says "...this approach is subject to considerable error...", and I heartily agree. It is not necessary to attempt reconstruction of pristine flows - we have current conditions, and we can impose estimates of future development effects on them. Gaged flows represent current conditions, but the authors would have us adjust these to pristine flows and then back to the present. 18-16

6. Page 134, 2nd par., and Table 4-2, page 135. I presume the reservoirs that would be removed in Wyoming are owned by BLM and are under permits from the Wyoming State Engineer. There is a notation that the water rights listed in Table 4-2 are discussed under water use, but I am unable to find an adequate discussion there or anywhere else. All water developments - wells, springs, reservoirs, and direct flow diversions - should be under State Engineer permits (water rights), but the "water rights" column of the Table does not match the other columns. My conclusion from this is that BLM has a number of unpermitted water developments in Wyoming. 18-17

18-13
The text and several tables (2-16 through 2-22, 3-9, and 4-3 through 4-11) have been revised to reflect your comment. (See the Text Changes section.) The Blacks Fork and Little Snake basins are now included in the analysis. The point on the North Platte River used to analyze salinity and water quantity has been moved upstream from Orin to Alcova, Wyoming, in order to reduce the size of the regional watershed to emphasize mining impacts to hydrology. The methodology for analysis remains the same.

However, the Alcova station does not provide sediment data. The nearest stream gaging station with sediment data is not on the North Platte but, given similar watershed characteristics, it is felt that the gage on the Medicine Bow River above Seminoe Reservoir can generate a representative sediment yield factor. This factor is then run through the analysis, with the same assumptions as used for the other tracts, but the results should be applied only to Seminoe Reservoir. The estimated annual sediment yield of 368 tons per year into the Seminoe Reservoir (whose total storage is 1,017,000 acre feet) converts to an increased deposition rate of 0.23 ac-ft/yr (using a factor of 1 ton per cu yd). This is insignificant and does not change our conclusions in the EIS.

18-14
Tables 3-9 and 4-3 through 4-11 have been revised to reflect your comment, as has the text. Please refer to the Text Changes section for the revised tables and text change.

18-15
Tables 3-9 and 4-12 and the text have been revised to reflect your comment (see the Text Changes section). The bedload was left out because of the serious lack of available data from the USGS gaging stations, and an incomplete understanding of bed storage and transport.

18-16
Tables 4-3 through 4-11 have been revised to reflect your comment, and the text has been revised to reflect the new table data. See the Text Changes section for the revised tables and numerous text changes relating to this comment.

18-17
The lease tracts in both Wyoming and Colorado have private surface ownership, which could explain some of the discrepancy in table 4-2. The general issue of water rights as it relates to regional consumptive use is discussed under Water Rights (Volume 1, page 134). Discussion of specific individual water rights or the legal problems associated with specific water rights is beyond the scope of the EIS.

7. Page 134, Water Use. I disagree with the suggestion that any increased use of water, at least in Wyoming, "...must depend on existing permitted uses that are not being fully utilized...". At this time, the North Platte River basin in the area of interest is considered fully appropriated, so far as surface water is concerned. 18-18

8. Table 4-3, page 136, supposedly carries over from the Chapter 3 material. I see no connection, and the "reconstructed" present (1980) flow does not even closely approach the 1980 measured flow of the North Platte River at Orin of 1,354,000 ac-ft. In the fourth footnote, uses from the Medicine Bow River and the North Platte River are assumed, but the Sweetwater River and numerous other tributaries are ignored. The next footnote addresses reservoir evaporation. It includes Seminoe Reservoir, but apparently ignores Pathfinder and Alcova Reservoirs. 18-19

9. Table 4-5, page 138, moves the site of interest from station 09217000, Green River near Green River, Wyoming, to a discontinued site below Flaming Gorge Reservoir - Green River at Flaming Gorge near Linwood, Utah. Actually there were two gages in the Linwood vicinity, one discontinued in 1938, the other in 1963. The current station in that area is 09234500, Green River near Greendale, Utah, with a record from 1950 to the present. This needs clarification, correction, and explanation as to why the shift from the basin defined in Chapter 3 was made. The Table shows export from the basin for "Cheyenne Stages I, II, and III." These exports are from,or proposed from, the Little Snake River, which is not reflected in the flow at the apparent gage site. They should be removed from Table 4-5, and would not appear in Table 4-6 for the Yampa River, either. 18-20

10. Page 139, item no. 3. Water use from aquifers more than 1,000 ft deep probably would not affect the base flow of streams as stated. Water use from such aquifers could, however, be considered a consumptive use in Wyoming and would require a State Engineer permit. 18-21

11. Page 139, Urban Water Pollution, 1st par. It makes no sense at all to take the lowest flow on record in a stream reach and translate it to an ac-ft/yr figure. This has no real meaning, and the statement about dilution can be made without a false "annual" value. 18-22

12. Pages 140-146, Salt Loading. Tha major question here for both the text and the tables is "where do the numbers apply?" There are some notations in Tables 4-8 through 4-11, but they raise almost as many questions as they answer. For example, Table 4-7 seems to bring numbers forward from Table 4-3 for the Orin gage, but Table 4-8 all at once refers to "at Seminoe Reservoir" in the last entry line. The other entries appear to apply at Orin. Table 4-10 apparently continues to include the exports from the Little Snake River noted above for Table 4-5 (comment 9). 18-23

18-18
Water can be fully appropriated without being fully utilized. Such water may be available for coal development. In addition, Volume I goes on to point out the possibility of "transfer of current water rights from other uses such as irrigation."

18-19
Tables 4-3, 4-7, and 4-8 have been revised to reflect your comment. They can be found in the Text Changes section.

18-20
Tables 4-5 and 4-6 have been revised to reflect your comment (Text Changes section).

18-21
It is felt that groundwater from 1,000 feet deep would not be naturally contributory (i.e., circulate) to surface water within the time frame of this EIS. It is therefore not included in the water balance. Both Colorado and Wyoming require all water users (including users of private wells) to have a water right or permit from the appropriate state agency.

18-22
We have deleted the annual value. See the Text Changes section.

18-23
Tables 4-8 through 4-11 have been revised to reflect your comments. (Refer to Text Changes section.)

13. I question the salinity concentration increase projected for the Green River on page 141 and in Table 4-10. The present (1980) concentration is given as 667 mg/l, whereas the USGS data for water year 1980 shows a 398-500 mg/l range for observed values at station 09234500. 18-24

14. The second paragraph of the second column on page 141 gives a modeled increase in salinity at Imperial Dam for the Maximum Leasing alternative of 0.06 mg/l. In the parenthetical note at the end of the paragraph, the last sentence states: "Water uses with the other leasing alternatives would be so small that they exceed computational accuracy of the equation used to calculate salinity". This statement should include the Maximum alternative also, as indicated in the fifth paragraph, and the fact that calculations in the model use imprecise data. The implication of two decimal place accuracy in the model result is misleading, when the model operates on a monthly flow basis and of necessity uses other lumped data, estimates, and approximations, and is built from incomplete knowledge. 18-25

The next paragraph indicates the salinity numbers of Table 4-7 give a false impression. The Table heading indicates an annual water balance. The text says the values for Table 4-7 were developed for low flow conditions, and apparently transformed as such to annual values. These were then carried into subsequent tables and discussion. 18-26

15. Page 147, Table 4-12. The Suspended Sediment column is in error for those tracts in the Green River drainage - the 0.11 figure should be 0.01 (see comments 3 and 4). The remaining columns with values calculated from this 0.11 figure would also be in error. What are the units for the final 7 columns of the Table? 18-27

16. The last sentence of the first column on page 150 approaches the Wyoming situation: "If any nearby domestic or stockwater wells were significantly impacted, the responsible mining company would have to replace the interrupted supplies (Colorado and Wyoming regulations)". This pertains not only to wells, but to all water supplies, including reservoirs, developed under Wyoming State Engineer permits. A basic principle of Wyoming water law is that there be no injury to an existing appropriator's water rights. 18-28

17. Page 152, 2nd par. under Unavoidable Adverse Effects. We are not told where this projected salinity concentration increase would occur in the Green River. In the last sentence the 0.06 mg/l increase at Imperial Dam is no longer qualified, but is here set forth as an absolute (see comment 14). 18-29 18-30

18-24
Tables 2-16 through 2-22, table 4-10, and the text (p. 141) have been revised to reflect your comment (Text Changes section). We now note that the Green River would be suitable for all current uses.

18-25
See response to comment 28-5.

18-26
The phrase "during low flow" has been deleted from the paragraph. See Text Changes section.

18-27
Table 4-12 has been revised, including the missing label, which is tons/yr. See the Text Changes section.

18-28
Only wells and water sources with adjudicated water rights have legal protection under state water laws. The text has been revised to reflect this (Text Changes section, p. 150 entry).

18-29
The impact also occurs at station number 09217000. See response to comment 18-24.

18-30
See response to comment 28-5.

18. The hydrologic mitigation study set out in Appendix 6, Mitigation Requirements, on page 279 should include all Wyoming tracts and not be limited to the 5 that are named. The hydrologic study should also specifically address the protection of water rights that might be affected by the proposed mining. 18-31

In summary, all portions of the DEIS that relate to water need to be re-examined and most need to be redone. Time precludes making all of the comments that should be made. The above are indicative of the problems we have with the document.

Thank you for the opportunity to review this Draft EIS. Your referral memorandum is being returned as requested.

LEA/ht

cc: George L. Christopulos
State Engineer

18-31
The hydrologic mitigation study requirement (p. 279 of Volume 1) has been amended as requested and, as revised, applies to all Rock Springs District tracts, as well as to all Rawlins District tracts (Text Changes section, pp. 278 and 279 entry).

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

LAND QUALITY DIVISION

401 WEST 19TH STREET TELEPHONE 307-777-7756 CHEYENNE, WYOMING 82002

MEMORANDUM

RECEIVED
1983 OCT 11 PM 3:35
BUREAU OF LAND MGMT.
LITTLE SNAKE R.A.
CRAIG, CO. 81625

TO: Robert E. Sundin, Director

FROM: Gary Beach, Mine Reclamation Programs Manager

DATE: September 9, 1983

SUBJECT: Green River - Ham's Fork Round II EIS

The single major deficiency in this document is the neglect of anlaysis on the potential damage to the Green River. The Green River is by common knowledge critical to the salt load in the Colorado. Only general unreferenced information is presented and impacts due to mining are considered insignificant with no obvious basis. This office disagrees. 18-32

There is an apparent heavy emphasis placed on those mines and lease areas in Colorado; disproportionately large compared to the emphasis in Wyoming. This may be due to more detailed information being available in Colorado. It appears to be due more to a familiarity of the authors with Colorado and it's situation, and a concurrent lack of familiarity with Wyoming. A final major point is that there are more potential Alluvial Valley Floors on some of the tracts (Byrne Creek for example) and these can be more fully investigated even with the scope of detail of this report. 18-33

BLM's leasing stipulations were considered to "be real, committed, and legally enforceable". From the Red Rim Petition process it has been shown that these BLM stips can change from day to day. In their analysis these "mitigation requirements have been factored into the analysis, i.e. only impacts remaining after mitigation (=BLM stips) is applied are considered". 18-34

An analysis of impacts without the BLM stips should also be considered since these are apparently subject to changes/modifications though the leasing process.

The following lists points of concern of a less serious nature.

1. The agency preferred alternative in the Summary is based on a leasing goal of tons of coal, not an assessment of impacts. Is this a proper direction?

18-32
We have modified our estimation of impacts to the Green River because of the better accounting procedure resulting from the inclusion of the Black's Fork and Little Snake rivers (see also comment 18-13). Even under the Maximum alternative, the cumulative impact at the year 2000 would be 404.9 mg/l. This would be acceptable for drinking water, based on the Public Health Service limit of 500 mg/l (PHS 1962).

18-33
As discussed on pages 151-152 of Volume 1, there are 14 alluvial stream deposits on various tracts in the region (including one on Byrne Creek Tract), but we do not have sufficient data at this time to determine whether they are alluvial valley floors.

18-34
The mitigation measures listed in the EIS are the result of land-use planning and site-specific analyses. They are considered to be real, committed, and legally enforceable and therefore are legitimately part of the proposed leasing alternatives. In instances, as in the case of Red Rim, where better information becomes available on which to base mitigation and BLM retains authority, better stipulations can be developed.

2. Alterations to the topography and soils are deemed by this office as significant, although the post-mining land use may not be changed. If no change in land use means that changes in topography are insignificant, then the definition of "significance" in impact assessment should be included.

3. The Red Rim wildlife study done by the University of Wyoming and the Wyoming Game and Fish is not necessarily positive to leasing (Page 1, Chapter 1). If identifies areas on Red Rim as "critical" habitat. 18-35

4. OSM and the Wyoming DEQ are jointly preparing the Red Rim EIS. (Page 1 Chapter 1). 18-36

5. In Chapter 2, the loss of scarce vegetation is not the only impact to the plant communities that should be assessed. This should include changes in production and community make-up. Again, if significant impact is equal to change in land use this should be specified. 18-37

6. Assumption Number 10 on Page 122 in the Environmental Consequences section may be entirely over-optimistic. Reclamation may not be "successful" by the Wyoming standards in 12 years. This 12 year period should be evaluated, referenced and documented. 18-38

7. On Page 131 it is stated that "All of the tracts in Wyoming ... lack adequate topsoil material". This is a serious statement, that this Division disagrees with and must be supported. 18-39

8. Under vegetation in the Chapter on the "Affected Environment", discrepancies occur in the common name/scientific name pairs that are not due to geographical differences (for example on Page 70, tall larkspur in aspen stands is not Delphinium nelsonii which is low larkspur, but possibly Delphinium occidentalis). 18-40

9. Definition of AUM is wrong: "with calf" should be inserted after "one cow..". (Page 95). 18-41

10. What is the basis for the vegetation type descriptions? References, etc. should be cited in the text. Same is true for impacts on vegetation starting on page 154. (Page 65). 18-42

11. The statement is made (and conclusion reached) that "Disturbance of vegetation would result in a insignificant regional impact, since reclamation regulations require conditions equal to or better than premining conditions to return". The big assumption here is that 100% of the disturbed acreage will be successfully reclaimed simply because the law requires it. Some areas having soil problems or lacking sufficient precipitation will probably not be reclaimable with present technology. The EIS states on Page 155 that "the reestablished plant communities would differ from the plant communities that existed prior to mining". This in itself is a significant impact. (Page 154). 18-43 18-44

18-35
Based on the study, BLM's decision was positive toward leasing.

18-36
Thank you for your information.

18-37
Chapter 2 is a comparison of both the significant and unknown impacts of the alternatives. The analysis of the impacts to the plant communities can be found in the Vegetation section beginning on page 154 of Volume 1.

18-38
For purposes of impact analysis, the 12-year period seems a reasonable minimum standard (2 years to complete revegetation after EML plus 10 years minimum for release of the bond). We agree that some areas may require longer to reclaim and have discussed the potential uncertainty of long-term reclamation in Volumn 1, page 133.

18-39
Change noted in Errata section (p. 131 entry).

18-40
There are many common names given to one specific plant, which makes the usage of common names both difficult and confusing. One of the common names given to Delphinium nelsonii is "tall larkspur", which is also one of the common names for D. occidentalis. One of the common names for D. oeyeri is "low larkspur." The larkspur mentioned in the document in the aspen community is D. nelsonii; it has been called tall larkspur, low larkspur, Nelson's larkspur, mountain larkspur, and other names. Delphinium occidentalis also occurs in the aspen communities of this region.

18-41
Change noted in Errata section (p. 95 entry).

18-42
The references for the vegetation type descriptions are stated on page 65. The areas described are taken from the Green River-Hams Fork Round I Coal EIS, the Southwest Wyoming Coal EIS, and the Meeker and Rangely Planning Unit documents. Type designations are those used by the BLM as described in BLM Manuals 9160-9162.

18-43
The EIS has pointed out reclamation problems that must be addressed during the mine permit process. Before development can occur, the developer must demonstrate that requirements of laws and regulations can be met.

18-44
Although a specific plant community on a specific location (e.g., sagebrush) would be lost as a result of mining, this would constitute an insignificant impact when the loss is compared to the millions of acres of sagebrush that exist.

THE STATE OF WYOMING

Ed Herschler, Governor
Leno Menghini, Superintendent and Chief Engineer

Wyoming State Highway Department

P. O. BOX 1708 CHEYENNE, WYOMING 82002-9019

August 30, 1983

Draft EIS Comments
Green River/Hams Fork Coal Round 2
State ID 83-128

RECEIVED
1983 OCT 11 AM 8:32
BUREAU OF LAND MGMT.
LITTLE SNAKE RES. AREA
CRAIG, CO 81625

Mr. Dick Hartman
State Planning Coordinator
2320 Capitol Avenue
Cheyenne, WY 82002

Dear Mr. Hartman:

We have reviewed the subject Draft EIS and offer the following comments:

1. Page 3-117. We do not agree with Service Level 'C' as the basis for determining operational impact on State Highways. Wyoming highways are designed to provide Service Level B; and they become candidates for improvement when they no longer provide this level of service. Therefore, development that causes service levels to fall below Level B impacts state highways. 18-45

2. Recreation traffic generated by increased populations would impact some highways leading to playground areas. Many highways leading to national forests and boating areas are obsolete and would have to be upgraded to accommodate significant increases in traffic. 18-46

3. Several tracts are located so that Interstate 80 or another State Highway lies between the tract and the main line of the Union Pacific Railroad. These highways will have to be crossed by the coal haul road, be it a railroad spur line or a truck haul road. Development of these tracts will have to include provisions for separating these crossings.

4. Where truck haul is contemplated, we strongly recommend that the mine develop its own private haul road and not attempt to utilize State Highways. Use of State Highways as an integral part of mining operations for a coal haul road could lead to overcrowding and rapid deterioration; and force the Highway Department to impose traffic controls and load restrictions.

18-45
Service Level 'C' was used to be consistent with what was utilized for Colorado and to facilitate ease of analysis. The Service Level 'C' figures were requested and received from Mr. J.D. Warburton, State Planning Engineer for the Wyoming State Highway Department. In addition, a telephone conversation with the State Planning Engineer's office clarified the use of some of the Service Level 'C' figures for I-80. The same analysis was done in the Green River-Hams Fork Round 2 Final EIS. (February 1980) using Service Level 'C'. We feel that reanalyzing the affected road segments using Service Level 'B' would show the same impacts and is therefore unnecessary.

18-46
The text has been changed by adding a general statement. See the Text Changes section (p. 215 entry). However, no specific locations are identified because none were identified in the comment and no data are available to analyze the impact of recreation traffic on highways or county roads.

5. The Winton tract would rely on the Atlantic City Spur Line which crosses several major streets in Rock Springs. To avoid unreasonable crossing delays, it may be necessary to break the trains into 20-25 car lengths for travel between the railroad yards in Rock Springs and the mine.

Very truly yours,

William P. King

William P. King, P. E.
Environmental Services Engineer

WPK/mg

50 Years of Service to Wyoming

THE GEOLOGICAL SURVEY OF WYOMING
UNIVERSITY OF WYOMING
BOX 3008, UNIVERSITY STATION
LARAMIE, WYOMING 82071
(307) 742-2054 (307) 721-3920 (307) 766-2296

MEMORANDUM

To: Dick Hartman, State Planning Coordinator
From: Gary B. Glass, State Geologist
Richard W. Jones, Coal Geologist
James C. Case, Environmental Geologist
W. Dan Hausel, Deputy Director
Ray E. Harris, Minerals Geologist
Subject: Green River/Hams Fork Coal Round #2 Draft EIS
State Identifier No. 83-128
Date: September 19, 1983

We have reviewed the Green River/Hams Fork Coal Round #2 Draft EIS and submit the following comments:

Page 11, Figure 22, titled: Projected Annual Baseline Coal Production for Wyoming.

18-47

The DEIS should point out that this is the baseline case for just four Wyoming counties and not Wyoming as a whole. The title and the note in the upper right-hand corner of the graph is misleading in this regard. The same comment applies to Colorado.

Pages 19-22, Tables 2-8, -9, -10, and -11

18-48

There is no explanation of what "EML" stands for in the tables. Also, is the total given for a particular year cumulative acreage (i.e., does it include acreage disturbed in previous years as well)? This ambiguity could be clarified by a change in the table headings.

18-49

Do the annual figures reflect any ongoing reclamation or land restoration (i.e., is reclamation subtracted out of totals)?

18-50

We presume acreage disturbed "off tract" means acreage on private and State lands. If this is not the case, what is meant by "off tract" in Tables 2-8, -9, -10, and -11?

. . . . .

18-47
Both figures 2-1 and 2-2 have been revised to clarify the geographic area being portrayed. See Errata section (p. 10 and p. 11 entries).

18-48
Total acreages given in tables 2-8 through 2-11 are cumulative. "EML" stands for "end of mine life." See Text Changes and Errata sections (pp. 19-22 entry).

18-49
Figures in tables 2-8 through 2-11 do not reflect any ongoing reclamation or land restoration. See the Text Changes section (pp. 19-22 entry).

18-50
"Off-tract" means land outside the proposed lease tract.

Pages 34-37, Table 2-20, -21, and -22

It would be easier to relate impacts to particular tracts if the tables identified the proposed mining method for each tract.

It appears that the effects of "checkerboarded" ownership in the Wyoming tracts was not considered as a "mineability" factor. If this is the case, where is this potential problem addressed in these tables? 18-51

Page 53, first four paragraphs, left column

At least in Wyoming, the Mesaverde Group is not spelled "Mesa Verde". Also, coal-bearing sequences are found in the Mesaverde Group, Lance Formation, Adaville Formation, and Fort Union Formation, but there are not coals throughout these formations. In addition, there are coals found in the Evanston, Wasatch, Frontier, Medicine Bow, Hanna, and Ferris formations of the region. It is recognized that either the proposed tracts are not located in these latter formations or the coals in these formations are not presently of interest. There are, however, some resource estimates mentioned on page 55 that include coals in the Medicine Bow, Hanna, and Ferris formations. 18-52

Page 53, Paleontology section

There is no mention of a report that was done specifically for the Bureau of Land Management by McGrew and Bown under contract YA-510-Ph7-3, titled: Fossil vertebrate faunas - Carbon, Lincoln, and Uinta counties, and a report by the same authors, prepared under contract YA-512-CT6-192, on the Green Mountain, Ferris-Seven Lakes, and Sandy EIS areas.

There are also no references to the paleontological reports for planned or on-going mines in the area other than the Leucite Hills mine. The Wyoming Geological Survey and the Land Quality Division of the Wyoming Department of Environmental Quality have paleontology reports on South Haystack, Skull Point, Bridger, Black Butte, and Medicine Bow mines to name a few. 18-53

Page 54, Figure 33

The Lewis Shale should be shown as "Lewis SH", not as "Lewis SN" on this figure. 18-54

Page 53 and 55, Geologic hazards section

There is no mention of potential subsidence over areas previously mined-out by underground mining methods. At least the following tracts are over or near mined-out areas:

Tract 98
Byrne Creek
Winton (subsidence is mapped in this area)
Indian Springs

18-51
The discussion of the checkerboard ownership pattern that exists in Wyoming is on page 93. It has not been included in the Comparison of Alternatives tables because it does not affect the mineability of the tracts analyzed in this EIS.

18-52
The presence of coal in these formations was not considered to be important for the level of analysis in this EIS.

18-53
Change noted in Text Changes section (p. 53 entry).

18-54
"Lewis SN" has been changed to read "Lewis SH". (Change noted in Errata section, p. 54 entry).

Care should be taken in these areas when siting roads, buildings, and other facilities.

The NE Cow Creek and Corral Canyon tracts are near windblown deposits. These windblown deposits could pose a problem if vegetation is removed from them.

Seismic intensities should be reported in Roman numerals (III or VI), rather than Arabic numerals (3.0 or 6.0). Not all epicenters are mentioned. In Carbon County, there are a number of epicenters in 1973. It is suspected that some of these may relate to blasting in existing coal mines. 18-55

18-55
Change noted in Errata section (p. 55 entry).

Page 55, Coal section

This section states that the coals in the Wyoming portion of the study area have not been extensively mined. This is not true. There has been extensive underground coal mining of Mesaverde coals on the east and west flanks of the Rock Springs uplift. In addition, coals in the Frontier and Adaville formation were or are extensively mined in the Kemmerer area; similarly, Hanna and Ferris formation coals are extensively mined in the Hanna area. 18-56

18-56
The text has been changed. Refer to the Errata section (p. 55 entry).

It is true that there has not been extensive mining around or near many of the tracts in this EIS, but not all the tracts. We are also not certain that each tract has been evaluated for its potential for underground or in situ extraction methods. In particular, the Byrne Creek Tract is contiguous with World Energy's planned in situ coal gasification project. In fact, federal lands in this tract abut World Energy's project to the north and south. This project is seeking loan guarantees from the Synthetic Fuels Corporation.

The EIS' estimate of 313 million tons of coal in the Hanna Basin is an outdated estimate of strippable coal resources made in 1972. Since then, the Wyoming Geological Survey has published Report of Investigations No. 17 (1979) and Report of Investigations No. 22 (1980), which present updated estimates of reserve base and resources of strippable coal. These reports indicate the original strippable reserve base was closer to 648 million tons in 1979. After these estimates were made, production and mining losses reduced the original strippable reserve base to 602.5 million tons by the end of 1981. 18-57

18-57
Thank you for this updated information. The "313 million tons" figure has been revised to read "603 million tons." See Errata section (p. 55 entry).

Remaining strippable reserve base in Wyoming's Green River Basin is more like 1.8 billion tons, rather than the 380 million tons cited in the EIS. See Wyoming Geological Survey Reprint No. 43 (1983), titled: Description of Wyoming coal fields and seam analyses. 18-58

18-58
The "380 million tons" figure has been revised to read "1.8 billion tons." See the Errata section (p. 55 entry).

As a general comment on this section, we feel it was too abbreviated - especially since the EIS is directly concerned with coal leasing. Anyone

unfamiliar with the area would be hardpressed to identify the coal-bearing formations in the area, to identify which coals are presently mined and by what methods, to assess coal quality in the various regions, to assess the quantity of coal currently mined in the various regions, and equally important, to assess how much coal underlies the whole region, either as a resource or as a reserve base.

Page 56, Other minerals

The section on "other minerals" should also acknowledge the presence of bentonite, phosphate, silica sands, potash, titaniferous sands, and the extensive oil shale deposits of the Greater Green River Basin. 18-59

18-59
Change noted in Text Changes section. (p. 56 entry).

General comment

If leasing of federal coal is accomplished, it doesn't necessarily follow that private and state coal will also be leased. In fact, almost every tract will have conflicts like this. How is this potential problem addressed? 18-60

18-60
The successful lessee of a Federal coal tract leases only Federal coal within the tract and does so with full knowledge of state and private coal ownership. It is the lessee's responsibility to obtain appropriate leases from either the state of Wyoming or the private owner.

TEXT CHANGES

The following section consists of reprinted paragraphs, pages, and entire sections from Volume 1. Changes and additions are underlined. Deleted material is not included. Revised tables are incorporated where necessary.

The Moderate Leasing Alternative section on page 8 is revised by adding the following paragraph:

Comment(s)

N/A The Corral Canyon Tract has been exchanged. It is assumed that the tract will still be developed in private ownership. The exchange is now in litigation. In the event that the tract is returned to Federal ownership, it would be considered for leasing. Therefore, the impacts are left in the EIS as analyzed.

The NOTE (first footnote) for tables 2-8 through 2-11 on pages 19 through 22 is revised to read:

NOTE: On-tract extraction disturbance includes only that area to be actually mined, while facilities disturbance includes all structures, haul roads, and topsoil and spoil stockpiles. Off-tract disturbance includes railroads, access roads, utility lines,
18-48 structures, etc., occurring on either Federal, state, or private
18-49 lands. Table figures do not reflect any ongoing reclamation, i.e., no reclamation acreage is subtracted out of the cumulative totals. EML is end of mine life (end of coal production)--it is assumed that reclamation would be accomplished 12 years after EML.

The Paleontology section on page 53 is revised as follows:

Paleontology

Vertebrate, invertebrate, and botanical fossils occur within coal-bearing strata of the region. The type of fossils present is dependent on the depositional environment and effectiveness of preservation. Vertebrate and botanical fossils are associated with continental deposits of late Mesozoic and Cenozoic age, while invertebrate and trace fossils are usually associated with marine deposits.

The region has not been intensively inventoried for paleontological resources. However, several surveys have been completed within the region under contract to BLM (Fossil Vertebrate Faunas--Carbon, Lincoln, and Uinta Counties, and a report on the Green Mountain,
18-53 Ferris-Seven Lakes, and Sandy EIS areas). In addition, numerous paleontological surveys have been prepared on existing coal mines in the region. The two surveys that have been done in both Wyoming and Colorado have found significant assemblages of vertebrate fauna. A paleontological survey conducted for the Bureau (Lucas

Comment(s)

and Kihm 1982) identified "abundant and hitherto unknown paleontologic locales, many of which are judged to be highly significant to significant" within the Williams Fork Formation in northwest Colorado. Fossil remains of vertebrates were identified during premining survey of the Leucite Hills Mine in the Almond Formation in Wyoming (Rocky Mountain Energy 1980).

The Other Minerals section on page 56 is revised by adding the following paragraph:

18-59 Bentonite, phosphate, silica sands, potash, and titaniferous sands are present in the region. Extensive oil shale deposits also exist.

The WATER RESOURCES Introduction and Surface Water sections on pages 57-62 are revised as follows:

WATER RESOURCES

Introduction

The Green River-Hams Fork Coal Region includes the upper parts of seven river basins and a portion of the Great Divide Basin, which has no drainage to either ocean. The North Platte River drains areas east of the Continental Divide to the Mississippi River, while the Colorado, Green, Little Snake, White, and Yampa rivers drain west of the Divide. The Bear River flows to Great Salt Lake and a number of small closed depressions are contained in the Great
18-13 Divide Basin, the largest of which is Separation Lake. The six major river basins of concern in this analysis are the North Platte, Green, Blacks Fork, Little Snake, Yampa, and White rivers.

Sizes of the watersheds included in this analysis were determined by the most suitable U.S. Geological Survey (USGS) gaging station records that encompassed all potential lease tracts. The hydrologic units chosen are the smallest drainage basins with conclusive data available and are large enough to indicate regional impacts, if any.

The Green River basin referred to in this analysis covers an area of 9,742 square miles upstream from Green River, Wyoming. The
18-13 North Platte basin encompasses 1,942 square miles above Alcova, Wyoming, including North Park in Colorado. The Blacks Fork basin covers an area of 3,100 square miles above Little America, Wyoming, including land in Utah.

The Yampa River basin covers an area of 3,410 square miles upstream from Maybell, Colorado. The White River basin encompasses an area

Comment(s)

18-13 of 3,680 square miles upstream from the Utah/Colorado state line. The Little Snake basin covers an area of 3,730 square miles upstream from Lily Park, Colorado.

Groundwater availability and chemical quality is greatly influenced by geology. In general, the older consolidated rocks yield water slowly (and of poorer quality) to wells and springs, whereas sand and gravel deposits in the younger unconsolidated deposits yield better quality water readily. The geologic structure generally controls the movement of water through the various structural basins. The groundwater characteristics are described separately for Colorado and Wyoming, even though many of the aquifers are found in both states. A discussion of groundwater phenomena that applies to the entire region precedes the state descriptions.

Further information on the basin-wide water resources in the Green River-Hams Fork area can be found in the Southcentral Wyoming Coal Environmental Statement, Southwestern Wyoming Coal Environmental Statement, and the Northwestern Colorado Coal Regional Environmental Statement (BLM 1979c and 1976).

Surface Water

Surface water in the EIS area serves a number of critical needs. Surface water is used for irrigation of cropland, for livestock and wildlife, and to meet demands by local industrial users and municipal governments.

Surface runoff from the coal areas ranges widely in quantity from one part of the region to another. Annual runoff is highest in the mountainous areas of the eastern part of the Yampa River subbasin, where annual precipitation exceeds 40 inches, and is lowest in the western part of the Yampa River subbasin and lower North Platte River basin, where annual precipitation is less than 12 inches.

Drainage Channels and Salt Loading

There are two distinct types of streams in the Green River-Hams Fork Coal Region: (1) streams that originate in and drain mountain areas and (2) streams which flow from coal area drainages. These are portrayed in the hydrology map in the map packet. Tables 3-7 and 3-8 show that the annual runoff from coal area drainages averages only about 35 acre feet per square mile, whereas annual runoff from mountain areas averages more than 18 times that amount. Taken together, these two types of streams represent the major coal region basins. None of the proposed tracts is found in a mountain watershed.

Stream and channel characteristics in the lower elevations of the drainages are meandering, causing much bank caving and sloughing

TABLE 3-7

HYDROLOGIC DATA* FOR SOME STREAMS DRAINING COAL AREAS

Basin	Station	Station † Number	Years of Record	Drainage Area (Sq mi)	Average Annual Runoff (ac-ft)	(ac-ft/ sq mi)	(inches)	Peak Discharge (cfs)	(cfs/ sq mi)	Minimum Discharge (cfs)	Range in 1980 Dissolved Solid (mg/l) Concentration	pH (Units)
Green	Vermillion Cr. at Ink Sprs. Ranch	09235450	5	816	2,340	2.9	.05	1,160	1.4	0	875 - 1200	8.3 - 8.6
Gt Divide	Separation Creek near Rines	09216527	5	55.3	1,520	27.5	.52	141	2.5	0	319 - 795	7.8 - 8.6
Green	Salt Wells Creek near S. Baxter	09216565	4	34.7	1,117	32.2	.60	347	10.0	0	510 - 1325	8.1 - 8.8
Green	Dry Canyon Creek near S. Baxter	09216578	4	3.69	17	4.6	.09	23	6.2	0	---	---
Green	Kill Pecker Creek at Rock Springs	09216810	5	--	--	--	--	--	--	--	1210 - 6680	7.5 - 8.9
Green	Ryckman Creek near Glencoe	09222200	1	53.4	--	--	--	29	0.5	.84	---	8.5 - 8.7
Green	Little Muddy Creek near Glencoe	09222300	4	416	14,790	35.6	.67	520	1.3	.72	401 - 2480	7.7 - 8.7
Green	Muddy Creek near Hampton	09222400	5	963	26,950	28.0	.52	754	0.8	0	327 - 2630	7.8 - 8.5
N Platte	Big Ditch near Coyote Springs	06630300	6	110	782	7.1	.13	396	3.6	0	708 - 1910	8.2 - 8.6
N Platte	North Ditch near Coyote Springs	06630330	5	22.6	434	19.2	.36	89	3.9	0	179 - 290	7.7 - 9.1
Yampa	Fish Creek near Milner	09244100	17	34.5	9,130	264.6	4.96	342	9.9	.40	161 - 483	8.0 - 8.4
Yampa	Middle Creek near Oak Creek	09243700	6	23.5	2,200	93.6	1.76	172	7.3	0	411 - 552	7.6 - 8.4
Yampa	Foidel Creek near Oak Creek	09243800	6	8.61	536	62.3	1.17	55	6.4	0	663 - 890	7.1 - 8.1
Yampa	Foidel Creek at Mouth	09243900	6	17.5	1,350	77.1	1.45	90	5.1	0	749 - 1500	7.6 - 8.2
Yampa	Wilson Creek near Axial	09250600	6	20.1	1,590	79.1	1.48	94	4.7	.12	502 - 1270	7.7 - 8.3
Yampa	Taylor Creek near Axial	09250510	7	7.22	94	13.0	.24	18	2.5	0	512 - 1270	8.0 - 8.6
Yampa	Trout Creek near Oak Creek	--	--	--	--	--	--	--	--	--	65 - 164	7.9 - 8.3
Yampa	Jubb Creek near Axial	09250610	6	7.53	77	10.2	.19	5.6	0.7	0	947 - 1510	7.8 - 8.6
Yampa	Morgan Gulch near Axial	09250700	1	25.6	736	28.8	.54	9.2	0.4	.08	992 - 1200	8.2 - 8.4
White	Coal Creek near Meeker	09304480	4	--	--	--	--	--	--	--	353 - 1700	7.5 - 8.2
White	Curtis Creek near Meeker	09304550	4	--	--	--	--	--	-	--	2160 - 5580	7.7 -
8.3												
AVERAGE FOR STATIONS						34.7	.92		3.9			

* From USDI Geological Survey 1980[a], 1980[b]

† U.S. Geological Survey (USGS) Station number. Locations of stations are shown on the water resources map.

TABLE 3-8

HYDROLOGIC DATA* FOR SOME STREAMS DRAINING MOUNTAIN AREAS

Basin	Station	Station † Number	Years of Record	Drainage Area (Sq mi)	Average Annual Runoff (ac-ft)	(ac-ft/ sq mi)	(inches)	Peak Discharge (cfs)	(cfs/ sq mi)	Minimum Discharge (cfs)	Range in 1980 Dissolved Solid (mg/l) Concentration	pH (Units)
N Platte	Grizzly Creek near Hebron	06611300	4	223	40,970	183.7	3.4	1,130	5.1	0.47	152 - 198	6.9 - 7.8
N Platte	Little Grizzly Creek above Coalmont	06611800	3	35.4	20,950	591.8	11.1	394	11.1	1.2	60 - 132	7.1 - 7.5
N Platte	North Brush Creek near Saratoga	06622700	20	37.4	36,080	964.7	18.1	1,120	29.9	4.7	---	---
N Platte	Encampment River at mouth	06625000	40	265	174,600	658.9	12.4	4,510	17.0	5.2	56 - 350	7.2 - 8.2
Green	New Fork River near Big Piney	09205000	26	1,230	523,100	425.3	8.0	9,170	7.5	90.	51 - 142	7.4 - 8.5
Green	Little Sandy Creek above Eden	09214500	26	134	13,910	103.8	1.9	1,450	10.8	0	70 - 427	7.4 - 8.4
Green	Hams Fork below Pole Creek	09223000	28	128	73,170	571.6	10.7	1,520	11.9	0.1	---	---
Yampa	Yampa River at Steamboat Springs	09239500	74	604	335,400	555.3	10.4	6,820	11.3	4.0	---	---
Yampa	Elk River at Clark	09241000	63	206	241,300	1,171.4	22.0	4,470	21.7	22.	---	---
Yampa	Elkhead River near Elkhead	09245000	28	64.2	38,830	604.8	11.3	1,870	29.1	0	---	---
Yampa	S. Fork Williams Fork River near Pagoda	09249200	14	46.7	30,650	656.3	12.3	910	19.5	0	109 - 327	7.1 - 8.6
Yampa	Little Snake River near Slater	09253000	36	285	163,000	571.9	10.7	4,180	14.7	8.6	50 - 160	7.2 - 8.4
White	White River above Coal Creek	09304200	20	648	388,300	599.2	11.2	4,900	7.6	6.5	118 - 302	7.5 - 8.6
White	Lost Creek near Buford	09302450	17	21.5	15,360	714.4	13.4	944	43.9	0.3	---	---
White	South Fork White River near Budge's	09303300	6	52.3	69,550	1,329.8	24.9	1,580	30.2	21.	---	---
AVERAGE VALUES						646.9	12.1		18.1			

* From USDI Geological Survey 1980[a], 1980[b]

† U.S. Geological Survey (USGS) Station number. Locations of stations are shown on the water resources map.

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and resulting in steep banks. This adds considerably to the sediment loads in the streams during periods of high runoff. These occurrences are during rapid snowmelt and early spring runoff, as well as during occasional intense summer thunderstorms.

The streams that drain coal areas have measured peak discharges per unit area that are unusually small for watersheds containing less than 35 square miles. Small watersheds characteristically have much higher unit peak discharges, often exceeding 100 acre-feet per square mile. This inconsistency is attributed largely to the short period of record of 1 to 7 years for the coal area drainages. Apparently, no large runoff events have occurred during this period. It is possible that the sandy soils in most coal areas tend to absorb most rainfall, thereby minimizing runoff. Table 3-7 shows that the annual runoff from the coal drainages averages about 0.92 inches.

Coal tract areas contain a number of reservoirs (listed in table 4-2 in Chapter 4)). Most of these are under 3 acre-feet in capacity and are used for livestock watering.

The runoff that nourishes the streams draining coal areas commonly contains more than 1,000 mg/l dissolved solids in the spring and fall, about two to four times the corresponding values for mountain area drainages. As tables 3-7 and 3-8 show, most of the water leaving the overall coal region originates in the mountain areas, while most of the dissolved solids (salt loading) are from areas surrounding the coal tracts.

Of the coal area drainages, there are two streams that are of critical concern: Fish Creek and Trout Creek, both of which are in the Yampa River basin. Fish Creek and Trout Creek are discussed in detail in the Kaman Tempo Report, 1982, titled "Cumulative Hydrologic Assessment: Effects of Coal Mining on the Yampa River Basin, Moffat and Routt Counties, Colorado." Both of the creeks have small watersheds which have high concentrations of active coal mining, with expansion being planned. There is a concern that elevated total dissolved solids from existing mines may increase to the point that water may become unusable for agricultural and aquatic wildlife.

18-13 Table 3-9 shows selected water resources data from the six major rivers that drain the region: the Green, North Platte, Blacks Fork, Little Snake, White, and Yampa. These gages were chosen to represent the area because they have good records over long periods of time. (Although the gage on the White River only has 8 years of recorded data, it correlates well with those at other downstream points.) The four major coal region rivers contrast markedly with the streams in mountain areas (table 3-8).

The water resources data found on table 3-9 on streams that drain the major coal region basins are taken from established gages that

TABLE 3-9

MAJOR COAL REGION RIVER BASINS

Station	Station Number	Drainage Area (Sq. Mi)	Average Discharge Ac.-ft./yr.	Ac.-ft./ Sq.mi.	Period of Record (Yrs)	1980 Suspended Sediment (ton/yr.)	Average Specific Conductance (Micromhos)	Average TDS** Mg/l	1980 Suspended Sediment Yield (Tons/Sq.Mi./Yr.)
Green River near Green River, Wyoming	09217000	9,742*	969,800	99.5	28	219,154	582	378	22.5
North Platte River (Medicine Bow River above Seminoe Res. near Hanna, Wyoming)	06635000	1,942	129,700	66.8	41	80,056***	1,376	895	41.2
Black Fork near Little America, Wyoming	09224700	3,100	244,900	79.0	18	2,459,562***	1,610	1,047	793.
Little Snake River near Lily, Colorado	09260000	3,730	415,100	111.3	59	1,900,100***	657	427	509.
White River near CO/UT state line	09306395	3,680	526,500	143.1	8	986,478	772	502	268.
Yampa River near Maybell, Colorado	09251000	3,410	1,280,000	375.4	64	651,041	639	416	191.

SOURCE: USGS Water Resources Data: Wyoming and Colorado 1980.

NOTE: This table has been revised as a result of comment 18-13.

* Actual drainage area 14,000 mi^2 of which 4,260 mi^2, is in Great Divide Basin and noncontributing to this gauge.

** TDS: total dissolved soilids determined to be 0.65 of specific conductance.

*** Time discharge weighted average calculated from periodic samples.

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have daily records. They therefore represent an average of all the parameters of the streams that drain both mountain and coal areas. The large systems do have a buffering effect on salt loading from the coal area streams.

Sediment Yield

Premining sediment yields were determined by dividing a river basin acreage by the tons per year of suspended sediment at the gages listed in table 3-9. The result, suspended sediment yield in tons
18-15 per square mile per year, was then applied to the lease tracts that lie in the river basins. Yields ranged from 21.9 to 793 tons per square mile per year. This figure is lower than most figures used for sediment yield for two reasons: (1) the results of erosion, overland transport, and sediment movement are deposited before reaching the gages; and (2) bed load transport, which could double the sediment yields shown above, is ignored.

Water Use

Present and projected consumptive annual use of water and concentrations of dissolved solids in the North Platte, Green, Blacks
18-13 Fork, Little Snake, White, and Yampa River watersheds for the time frames addressed in this analysis are presented in tables 4-3 through 4-6 in the next chapter. Conditions in both watersheds were approximated by working backwards from known consumptive uses of water and changes in salt load as a result of human activities
18-16 to estimate undepleted water supply. As this approach is subject to considerable error, the conditions shown should be regarded as indicative of inferred water supply for a typical year, in this case 1980.

Urban Pollution

The Green River-Hams Fork region is sparsely populated. The population was about 121,609 in 1980. The average density was about 3.5 persons per square mile, compared with a national average of 64. The major towns in the region currently have adequate wastewater treatment plants or plants under construction.

Flood Plains and Alluvial Valley Floors

There are 45 flood plains, 1 alluvial valley floor, and 14 alluvial stream deposits on the proposed lease tracts. See the Glossary for definitions of flood plains and alluvial valley floors.

Table 3-13 on page 74 is revised as follows:

TABLE 3-13

KEY WILDLIFE SPECIES IN THE HABITAT ANALYSIS AREA 1/

Species	Rationale for Key Designation
Big Game	
Elk	High economic and recreational value
Mule Deer	High economic and recreational value
Pronghorn Antelope	High economic and recreational value
Moose	High economic and recreational value
Game Birds	
Sage Grouse	High interest and recreational value
Sharp-tailed Grouse	High interest
Canvasback	MBHFI 2/
Sensitive Species	
Merlin	High interest
Burrowing Owl	High interest
Ferruginous Hawk	High interest and MBHFI
Golden Eagle	Protected by law and MBFHI
Long-billed Curlew	MBHFI
Prairie Falcon	MBHFI
Black-crowned Night Heron	MBHFI
Great Blue Heron	MBHFI
Osprey	MBHFI
Black Tern	MBHFI
Bonneville Cutthroat Trout	Rare in Wyoming
Fish	
Coldwater Gamefish	High economic and recreational value
Warmwater Gamefish	High economic and recreational value
Threatened and Endangered	
Federal	
Bald Eagle	Protected by law and MBHFI
Whooping Crane	Protected by law
Black-footed Ferret	Protected by law
Colorado Squawfish	Protected by law
Peregrine Falcon	Protected by law and MBHFI
Humpback Chub	Protected by law
Bonytail Chub	Protected by law
State	
Greater Sandhill Crane	Protected by law and MBHFI
Razorback Sucker	Protected by law
Colorado River Cutthroat Trout	Protected by law

1/ Habitat analysis area includes the lower Yampa River.

2/ Migratory bird of high Federal interest.

The Threatened and Endangered Animals section, last paragraph, on page 85 is revised to read:

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15-17 All threatened and endangered species are protected by law. In Colorado (Craig District), formal consultation under Section 7 of the Endangered Species Act was requested on December 3, 1982, and completed on March 21, 1983, with a U.S. Fish and Wildlife Service (USFWS) Biological Opinion. In Wyoming (Rock Springs and Rawlins districts), formal Section 7 consultation was requested on October 14, 1983, and completed with a USFWS Biological Opinion dated November 18, 1983, plus a supplementary Biological Opinion dated December 1, 1983. In all three cases, a finding of "not likely to jeopardize the continued existence of any species currently listed" was rendered, with the condition that each specific mine plan would be submitted to USFWS for review and comment.

The Introduction to the Environmental Consequences chapter on page 121 is revised by adding the following paragraph:

N/A The Corral Canyon Tract has been exchanged. It is assumed that the tract will still be developed in private ownership. The exchange is now in litigation. In the event that the tract was returned to Federal ownership, it would be considered for leasing. Therefore, the impacts are left in the EIS as analyzed.

The WATER RESOURCES Surface Water section on pages 133-148 is revised as follows:

WATER RESOURCES

Surface Water

18-13 Under the No Action and the various leasing alternatives, development would impact surface water resources both onsite and to the receiving waters downstream, which are the North Platte, Green, Blacks Fork, Little Snake, Yampa, and White rivers. Impacts would include:

1. Channel modification--the alteration or removal of existing stream channels in surface mined areas

2. Subsidence effects--possible results to surface drainage if subsidence occurs

3. Water use--results of increased consumptive use of water

4. Urban water pollution--the pollution of rivers by sewage effluent

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5. Salt loading--increased salinity of receiving waters downstream

6. Sediment yield--effects of erosion and sedimentation

Channel Modification

Surface disturbances in conjunction with surface and underground mining as a result of the leasing of new Federal coal would alter or remove all natural stream channels, insignificant flood plains, and existing reservoirs (stockponds, etc.) within disturbed areas. These impacts should be very local, relatively minor, and generally short-lived because of regulations enforced by the Colorado Mined Land Reclamation Board and Wyoming Department of Environmental Quality. Because of restrictions on mining on alluvial valley floors and within 100 feet of perennial or intermittent streams, channel disturbance would be limited primarily to ephemeral streams. Moreover, regulations require that disturbed channels be restored to a condition that approximates premining stream channel characteristics. The protection afforded perennial and intermittent streams and the required efforts to reconstruct "stable" channels in reclaimed areas should minimize impacts to stream channels.

The number of reservoirs removed under the various leasing alternatives are listed in table 4-2. As most of these reservoirs have a remaining capacity of less than 3 acre-feet and are rapidly filling with sediment, the impact would be minor and could be easily mitigated by the construction of new reservoirs on the reclaimed surface. (Water rights listed in the table are discussed under Water Use, while springs and wells are covered in the Groundwater, Aquifer Removal Section.)

The concentration of transportation routes through Dugway Canyon could cause minor impacts to the North Platte River, including decreased channel stability, increased streambank erosion, and disturbance of flood plains, with secondary impacts to recreation due to decreased fishing. Alternate routing of transportation would mitigate this impact.

The No Action alternative's impact to channels and wetlands would arise from scattered noncoal development on private surface lands similar to that described for the leasing alternatives. Impacts from noncoal development would be largely unmitigated because mining regulations would not apply. This would probably reduce the biological values of those lands.

Subsidence Effects

Underground mining by continuous miners using conventional room-and-pillar methods as anticipated in all subsurface mined tracts

TABLE 4-2

NUMBER OF WELLS, SPRINGS, AND RESERVOIRS THAT COULD BE IMPACTED AT THE ALTERNATIVE LEVELS

	Would be Removed or Replaced			Near or on Lease Tract			
	Wells	Springs	Reservoirs	Wells	Springs	Reservoirs	Water Rights
Deadman				0	0	0	0
Leucite Hills				0	3	1	0
Point of Rocks			1	3	0	1	0
Tract 98				0	0	1	0
Prairie Dog		1	1	0	1	6	0
Little Middle Creek			1	3	0	13	6
Middle Creek				0	2	15	4
Low Alternative Subtotal	0	1	3	3	6	37	10
Atlantic Rim	4	12	3	30	50	3	6
Byrne Creek				0	2	3	0
Corral Canyon				3	0	2	4
Wild Horse Draw	2	2		2	2	0	4
Rattlesnake Mesa		3		0	3	2	4
Signal Butte				0	0	4	0
Moderate Alternative Subtotal	6	18	6	38	63	51	28
Indian Springs				20	0	2	5
Pio				2	2	1	0
Winton				0	0	0	0
Peck Gulch		3	2	2	8	6	5
Iles Mountain		1	1	2	2	7	0
Fish Creek		1	1	9	4	16	13
High Alternative Subtotal	6	23	10	73	79	83	51
Northeast Cow Creek	14	3	1	17	3	1	5
Bell Rock	1			7	1	3	2
Williams Fork Mountain	1		8	3	11	40	11
Lay Creek			4	14	0	24	0
Horse Gulch	2		1	3	5	2	1
Maximum Alternative Subtotal	24	26	24	117	99	153	70

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should cause little or no subsidence at the surface (see Geology section). Any consequent changes in ephemeral channel geometry should be very minor and short-lived since these channels are continuously readjusting their size, shape, gradient, etc., to maintain approximate equilibrium with fluctuating flow conditions. Perennial channels are protected by Colorado and Wyoming regulations that restrict mining which could materially damage a renewable resource.

Generally, any water intercepted by an underground mine would be discharged at the surface according to its National Pollutant Discharge Elimination System permit, offsetting any major impacts.

Short reaches of streams could possibly be dewatered between the point of infiltration into the ground and the point of discharge because of subsurface effects of subsidence (if it occurs). The extent and probability of such occurrences would constitute an insignificant impact on a regional basis. There are areas of concern identified by the Colorado Mined Land Reclamation Board, including Middle Creek Tract (introduced under the Low alternative), Rattlesnake Mesa Tract (Moderate alternative), Peck Gulch and Fish Creek tracts (High alternative), and Bell Rock Tract (Maximum alterantive); more hydrologic information is required in order to predict potential impacts from subsidence.

Water Use

Most runoff occurs during the spring snowmelt period and cannot be effectively utilized within the region in the absence of adequate storage reservoirs. Throughout the remainder of the year, virtually all flow in the four major rivers is fully appropriated and will not satisfy all existing water rights during many, if not most, years. Any increased use of water by new development under the No Action alternative, therefore, must depend on existing permitted uses that are not being fully utilized or on the transfer of current water rights from other uses such as irrigation. Maximum utilization of existing rights could further decrease river flows during critical low flow periods, but the transfer of existing rights from one consumptive use to another would not cause any decrease in flows.

As can be seen in table 4-3, projected development under the No Action alternative is estimated to increase the present (1980) consumptive use of water in the North Platte watershed by 490 acre-feet per year (ac-ft/yr), a less than 1.0 percent increase
18-16 from the present to the year 2000. The corresponding increases in the White, Green, Yampa, Blacks Fork, and Little Snake watersheds could be as much as 125,900, 56,170, 49,555, 39,740, and 112,300
18-13 ac-ft/yr, or 156, 17, 64, 40, and 459 percent over 1980 total
18-13 consumptive use (see tables 4-4, 4-5, 4-6, 4-6A, and 4-6B). (The increase in consumptive use of the Green River is based on projections by the Wyoming Water Development Commission in 1981.) This

TABLE 4-3

ESTIMATED ANNUAL WATER BALANCE
FOR THE NORTH PLATTE RIVER AT ALCOVA, WYOMING (06642000) WITHOUT LEASING NEW FEDERAL COAL

Supply and Consumption Categories	Present 1980	1992	1995	2000
WATER SUPPLY:				
Total undepleted water supply (ac-ft) **	965,850	965,850	965,850	965,850
Import to Basin †	7,170	97,170	97,170	97,170
Export from the Basin †	-7,170	-97,170	-97,170	-97,170
Consumptive use:				
Irrigation (ac-ft) †††	285,760	285,760	285,760	285,760
Reservoir evaporation (ac-ft) ††††	83,800	83,800	83,800	83,800
Municipal and rural (ac-ft) °	3,250	3,230	3,320	3,540
Industrial °°° and existing mines (ac-ft) °°	500	600	700	700
Total consumptive use (ac-ft)	373,310	373,390	373,580	373,800
Net discharge without leasing of new Federal coal (ac-ft)	592,540*	592,460	592,270	592,050

FOOTNOTES:

NOTE: This table has been revised as a result of numerous comments in comment letter 18.

* Total discharge for water year 1980 from USGS Water Resources Data for Wyoming

** Estimated from USGS water resources data and inferred consumptive uses

† Diversion from Cheyenne Stages I, II, and III as reported by the Wyoming Water Development Commission 1981

††† Assumes irrigation of 12 inches of water per acre and 215,000 ac-ft used from North Platte River and 70,760 ac-ft used from tributaries.

†††† Seminoe Reservoir -35,100 ac-ft/yr; Pathfinder Reservoir -39,600 ac-ft/yr; Alcova Reservoir -9,100 ac-ft/yr

° Assumes consumptive use of 125 gal/day/person treated water supply of 200 gal/day/person less sewage effluent of 75 gal/day/person

°° Most of the water consumed by existing coal mines is not a consumptive use of river water

°°° Includes baseline projects (Chapter 2), industries such as food processing, and local services

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increased consumptive use of water by projected developments would depend on existing water rights currently not being fully utilized or on the transfer of current rights from other uses.

Any appraisal of the effects of leasing new Federal coal on the
18-13 available water supply in the six major regional watersheds is tenuous at best and requires a clarification of the concept of consumptive use of water in relation to established water rights. Logic dictates that any impact on the available water supply stemming from the development of new Federal coal depends not so much on the total amount of water used in the course of that development as on how much the use of that water reduces the
17-4 currently available supply elsewhere in the watershed. Table 4-2 shows the number of existing on-site water rights and surface water sources in the lease areas that would require mitigation by the lessee.

To estimate the increased consumptive use of water attributable to the leasing of new Federal coal under the four leasing alternatives, it was assumed that:

1. All water consumed by the increased population would decrease flow in the respective river systems accordingly.

2. Increased consumptive use by mining would be limited to that estimated fraction of total use, based on field observations, that formerly reached a perennial stream.

3. Water obtained from aquifers more than 1,000 feet deep in the coal areas would not affect the base flow of streams within the projected mine lives and, therefore, would not be treated as increased consumptive use.

The results shown in tables 4-7A and 4-7B should be on the high side and probably exaggerate slightly the effects of this increased consumptive use under the Maximum Leasing alternative.

18-16 Table 4-7A shows a maximum possible increased consumptive use of 1,160 acre-feet annually in the North Platte watershed under the
18-16 Maximum alternative by the year 2000, which is less than 1.0 percent of the total undepleted water supply. If all water consumed by new leases and the resulting population (the major consumer) were taken from the irrigation sector in the North
18-16 Platte, 1,710 acres would be removed from production (BurRec 1980).

18-13 For the Green, Yampa, White, Blacks Fork, and Little Snake rivers, a total of 780, 1,050, 230, 70, and 125 acre-feet, respectively, would be converted from other uses to support new coal leasing under the Maximum alternative (see tables 4-7A and 4-7B). Again,
18-13 if this water were all taken from the irrigation sector, 1,150, 1,550, 340, 100, and 180 acres could be removed from production

TABLE 4-7A

SUMMARY MATRIX OF ANNUAL WATER BALANCE AND WATER QUALITY
AT MAXIMUM DEVELOPMENT AT THE YEAR 2000

	North Platte 06642000			Green River 09217000			Blacks Fork 09224700		
	Total **	Change *	Percent †	Total	Change	Percent	Total	Change	Percent
WATER SUPPLY (ac-ft)									
Total Undepleted Water Supply ††	944,690			1,659,625			375,990		
Consumptive Use:									
Municipal and domestic	4,600	1,060	23	10,510	580	6	4,390	20	<1
Mines, industry, and power plants °	800	100	13	58,930	200	<1	18,995	50	<1
All other consumptive use	348,400			313,700			116,915		
Total Consumptive Use (cumulative impact)	353,800	1,160	<1	383,140	780	<1	140,300	70	<1
Net discharge with leasing new Federal Coal	590,890			1,276,485			235,690		
SALT LOAD (tons/year)									
Sources of Salt:†††									
Municipal Waste	7,065	175	2	1,715	95	6	715	5	1
Mines and industry °°	675	325	48	4,465	440	26	1,900	90	5
All other sources	442,105			723,855			254,640		
Reduction in Salt Load From:									
Consumptive use of water by mines, industry, and power plants	-330	40	12	-24,060	80	<1	-7,755	20	<1
Consumptive use of water by people	-1,690	250	23	-2,505	140	6	-1,045	5	<1
Other reduction of salt load †††	-13,220			0			0		
Total Salt Load (cumulative impact)	434,605	210	<1	703,470	315	<1	248,455	70	<1
Discharge weighted average dissolved solids in mg/L	540.4			404.9			774.5		
Net increase in dissolved solids with leasing new Federal Coal	1.4		<1	-2.1		<1	8.5		1.1

FOOTNOTES:

NOTE: This table has been revised as a result of numerous comments in comment letter 18.

* Change exclusively due to leasing and development of new Federal coal
** TOTAL is total estimated quantity with leasing and development of new Federal coal
† Percent is a percentage of what part the change makes up the TOTAL
†† From Tables 4-3, 4-5, and 4-6B
††† From Tables 4-8, 4-10, and 4-11B
° Estimated at 50 ac-ft per year for new mines
°° Estimated from a salt load study (EFC 1980) and projected surface disturbance

TABLE 4-7B

SUMMARY MATRIX OF ANNUAL WATER BALANCE AND WATER QUALITY
AT MAXIMUM DEVELOPMENT AT THE YEAR 2000

	Yampa River 09251000			White River 09306396			Little Snake 09260000		
	Total **	Change *	Percent †	Total	Change	Percent	Total	Change	Percent
WATER SUPPLY (ac-ft)									
Total Undepleted Water Supply ††	1,357,840			635,900			581,892		
Consumptive Use:									
Municipal and domestic	6,060	650	11	2,290	180	8	101	25	25
Mines, industry, and power plants •	13,355	400	3	149,750	50	<1	2,950	100	3
All other consumptive use	109,030			54,890			133,870		
Total Consumptive Use (cumulative impact)	128,445	1,050	1	206,930	230	<1	136,921	125	<1
Net discharge with leasing new Federal Coal	1,229,395			428,970			444,971		
SALT LOAD (tons/year)									
Sources of Salt: †††									
Municipal Waste	985	105	11	370	30	8	17	5	29
Mines and Industry ••	2,455	720	29	670	40	6	440	440	100
All other sources	393,735			307,900			185,285		
Reduction in Salt Load From:									
Consumptive use of water by mines, industry, and power plants	-5,455	165	3	-61,145	20	<1	-1,205	40	3
Consumptive use of water by people	-1,445	155	11	-545	10	2	-25	5	20
Other reduction of salt load †††	-480			0			-16,530		
Total Salt Load (cumulative impact)	389,795	505	<1	247,250	40	<1	167,982	400	<1
Discharge weighted average dissolved solids in mg/L	233.0			423.5			277.4		
Net increase in dissolved solids with leasing new Federal Coal	-1.0		<1	10.5		2.5	.4		<1

FOOTNOTES:

NOTE: This table has been revised as a result of numerous comments in comment letter 18.

* Change exclusively due to leasing and development of new Federal coal
** TOTAL is total estimated quantity with leasing and development of new Federal coal
† Percent is a percentage of what part the change makes up the TOTAL
†† From Tables 4-4, 4-6, and 4-6A
††† From Tables 4-9, 4-11, and 4-11A
• Estimated at 50 ac-ft per year for new mines
•• Estimated from a salt load study (EFC 1980) and projected surface disturbance

Comment(s)

18-13 from the Green, Yampa, White, Blacks Fork, and Little Snake rivers, respectively (WRC 1971; BurRec 1980; USDA 1966). This is not significant regionally because it represents less than one percent of the total irrigation in the region.

Urban Water Pollution

Under all alternatives, sewage effluent discharged into the North Platte River and the Yampa River by municipal sources would have the greatest effect on aquatic biology during periods of low flow when effluent dilution was minimal. The lowest flow on record in the North Platte River downstream from Sugar Creek is 70 cubic feet
18-22 per second. Dilution of sewage effluent at this flow would be more than adequate to prevent any significant degradation of the aquatic biology downstream.

Results of a study on the wastewater assimilative capacity of the Yampa River between Steamboat Springs and Hayden during September 1975 (Bauer, Steel, and Anderson 1978) indicate that pollutants that could degrade aquatic biology would be mitigated by completion of regional wastewater treatment plants in the Steamboat Springs and Craig areas. The Steamboat Springs plant has been completed; the Craig plant is currently under construction.

Extensive urban growth in the Green and White River watersheds would eventually exceed current wastewater treatment plant capacities. Plants would require upgrading to comply with the Clean Water Act. However, by about 1995 under both the No Action and four leasing alternatives, Meeker could have problems financing a new wastewater treatment plant. South Superior in Wyoming would also have a potential financing problem in 1995 under the High and Maximum alternatives. These towns would have to seek outside sources for funds, e.g., energy impact assistance, to meet wastewater treatment requirements.

Pollutants in wastes are minimized by effluent standards enforced by the Wyoming Department of Environmental Quality and the Colorado Department of Health through National Pollutant Discharge Elimination System permits.

The extent of degradation in water quality in the reaches downstream from urban growth due to new leases in the major rivers has not been quantified. However, any impacts on aquatic biology are expected to be minimal and short term due to state discharge regulations requiring wastewater treatment plants.

Salt Loading

Development under the No Action alternative is expected to increase the salinity of receiving waters because of increased salt loading

Comment(s)

(also expressed as total dissolved solids, or TDS) from municipal and industrial wastes, mine effluent, and leaching of spoils, and from the salt concentrating effects of the consumptive use of good quality water that formerly diluted poorer quality water entering the surface water system downstream. The following discussion includes surface water and groundwater contributions to salinity downstream. Individual groundwater contributions are discussed later.

18-13 Projected development under No Action can be expected to increase the salinity of receiving waters downstream in the six major rivers (discussed below), with a subsequent increase in the lower Colorado River at Imperial Dam to 962 mg/l by the year 2000 (BLM 1983). Water normally becomes unusable for certain crops when total dissolved solid levels exceed 1,000 milligrams per liter (mg/l) (EPA
18-11 1976). The Colorado River Water Quality Improvement Program is directed at reducing the salinity at Imperial Dam to 1972 levels, and the predictions for the year 2000 do include water quality improvement projects recommended by the Bureau of Reclamation.

18-16 Salinity in the North Platte River under the No Action alternative would increase about 3 percent from the present level of about 523 mg/l dissolved solids (table 4-8) to a maximum of about 539 mg/l over the long term. Water containing this much salt is suitable for all current downstream uses, so no problems are anticipated.

18-16 Salinity in the Yampa River under No Action would increase about 3 percent from the present level of about 228 mg/l to a maximum of about 234 mg/l over the long term (table 4-9). This water would be suitable for all current uses.

18-13/ 18-24 Salinity in the Green River would increase about 17 percent from the present level of about 348 mg/l to a maximum of about 407 mg/l over the long term (table 4-10). A large portion of this increase is attributable to high projected baseline agricultural use in the Green River basin (Wyoming Water Development Commission). This water would be suitable for all current uses.

18-16 Table 4-11 shows salinity in the White River would increase about 5 percent under the No Action alternative from the present level of about 392 mg/l to a maximum of about 413 mg/l over the long term, which would be acceptable for most uses.

18-13 Table 4-11A shows the salinity in the Little Snake River would increase about 32 percent under the No Action alternative from the present level of about 210 mg/l to a maximum of about 277 mg/l over the long term. This would be acceptable for most uses.

18-13 Finally, table 4-11B shows the salinity in the Blacks Fork River would increase about 46 percent under the No Action alternative from about 537 mg/l to a maximum of about 783 mg/l over the long term. This level would be acceptable for most uses.

Comment(s)

In analyzing the Maximum alternative, it was assumed that any change in discharge or salt loading upstream would cause an identical change downstream. The results, therefore, should be regarded as reflecting a "worst-case" condition.

18-13 A depletion of 2,225 ac-ft/yr in the Colorado River basin is expected under the Maximum alternative because of increased consumptive use. This does not represent a significant problem; however, when combined with other factors such as urban pollution, mine effluent, and leaching of spoil piles, water depletion represents a significant impact relative to standards set by the Federal Water Pollution Control Act Amendments of 1972. The above cumulative
18-25/ impact would result in considerably less than 1.0 mg/l increase in
28-5 salinity at Imperial Dam, California, based on modeling using the Colorado River Basin Simulation System. Although this is a small increase, it is significant because it occurs in a system that is already salt-laden. (This is the salinity increase associated with the maximum level of development. Water uses with the other leasing alternatives would be so small that they exceed computational accuracy of the equation used to calculate salinity.)

On completion of mining, groundwater discharge would resume once the spoils had resaturated to a level higher than the adjacent streams. Considerable uncertainty exists as to both the amount of postmining discharge from each mine area and the dissolved solids concentration in the water reaching the streams. The increase in dissolved solids concentrations for the various streams with
18-26 development of new Federal coal is shown in tables 4-7A and 4-7B.

Even with the cumulative effect of salt loading, most rivers are
18-24 predicted to be usable for existing uses under the Maximum alternative.

The water requirements necessary to support additional coal leases and associated urbanization under the four leasing alternatives would be virtually unnoticed downstream in the Colorado River system because of dilution from other rivers. Even the small
18-25/ increase in salinity that is calculated to occur under the Maximum
28-5 alternative may be beyond the accuracy of the equation used.

The fact that the increase in salt loading is not measurable in a large river system does not mean that salt loading would be insignificant in a smaller system. Two streams of critical concern, Fish and Trout creeks, drain much smaller watersheds, have ongoing coal mining operations within their watersheds, and are in an area where increased land disturbance is planned and geologic conditions promote naturally high total dissolved solids concentrations. Due to these factors, salt loading to these two streams would be significant.

Comment(s)

Middle Creek and Little Middle Creek tracts (introduced under the Low alternative) and the Fish Creek Tract (High alternative) are in the watersheds of critical concern to Trout and Fish creeks. The Kaman Tempo Report (1982), prepared for the Office of Surface Mining, specifically studied the effects of coal mining on these two creeks. It is noted that "the elevated TDS (total dissolved solids) concentrations in the Yampa River during low flow and in Fish Creek may have an adverse impact on agricultural uses of water from these drainages."

20-1 The U.S. Geological Survey's Water Resource Division conducted a model simulation for the Trout Creek basin and published a report after the release of the DEIS (Park & Norris 1983). This same model was utilized to assess the impacts to Fish and Trout creeks and the upper Yampa River from leasing of the Middle Creek and Fish Creek tracts. The model examined salinity impacts based on development at the year 2000, with changes to the calibrated model as described in Appendix 7.

Concentration values for sulfate (SO_4) and chloride (Cl) were derived by using linear regression curves between specific conductance and periodic sampled values of sulfate and chloride as reported in the synoptic water quality study for the south half of the Yampa River basin (Maura 1983).

Table 4-W displays the results from the model simulation, which are expressed as mean monthly values. The range is derived from extreme values encountered in 6 years of calibration of the model; these extreme values approximate peak and low flow values.

The Colorado Department of Health (1980) has set a standard of 250 mg/l for sulfate and chloride. Fish and Trout creeks at maximum concentrations would violate state standards for sulfate but not for chloride under the No Action alternative. The leasing alternatives would result in slight additional increases in sulfate concentrations. The model indicates that the water would be suitable for agricultural use under all alternatives.

The possibility exists, as continued coal development took place, that total dissolved solids concentrations would increase in and around all of the coal lease tracts. The degree to which these concentrations would increase and the impacts which would result cannot be determined at this time. However, it can be said that total dissolved solids levels are not expected to increase as much regionwide as in Fish and Trout creeks. At the present time, no other coal lease tracts have been specifically identified as being in a watershed with all the characteristics of the two critical streams.

TABLE 4-W
ESTIMATED WATER QUALITY
FOR FISH AND TROUT CREEKS AND UPPER YAMPA RIVER

Stream Name	Existing Conditions (Min/Max)	No Action Alternative: Baseline Conditions at 2000 (Min/Max)	Low Alternative: Middle Cr. Tract plus Baseline (Min/Max)	High Alternative: Fish Cr. Tract plus Low Alt. (Min/Max)
Discharge, in cubic feet per second (mean discharge per month)				
Fish Creek	0.3/ 194.6	8.3/ 203	8.3/ 203	8.3/ 203
Trout Creek	10.5/ 248.3	18.5/ 248	19.8/ 248	19.8/ 248
Upper Yampa R. (09244410)	118 /6,755	127 /6,757	128 /6,759	128 /6,759
Dissolved Solids Concentration in milligrams per liter (mean concentration per month)				
Fish Creek	330/490	375/932	375/932	376/936
Trout Creek	250/467	316/612	324/623	324/624
Upper Yampa R. (09244410)	61/230	62/245	62/250	62/251
Sulfate Concentrations in milligrams per liter (mean concentration per month)				
Fish Creek	103/109	130/464	130/464	130/466
Trout Creek	92/216	130/297	134/304	134/305
Cloride concentration in milligram per/liter (mean concentration per month)				
Fish Creek	3.0/6.0	4/12	4/12	4/12
Trout Creek	2.0/4.0	2/5	2/6	2/6

NOTE: This table has been added to the EIS as a result of comment 20-1.

Comment(s)

Sediment Yield

The greatest portion of sediment load in streams in the EIS region is derived naturally from the more arid lower elevations. Vegetation cover begins to be sparse in areas with less than 10 inches of total precipitation. Friable streambank soil types, coupled with poor range condition, improper land use, and lack of protective vegetation cover, would account for the high sediment yields under the No Action alternative that would continue to characterize some of the streams in the major river drainages at lower elevations.

The proposed developments under No Action could add as much as
18-13 7,360 tons per year due to surface disturbance to the North Platte sediment discharge by the year 2000. Likewise, 1,100, 5,100,
18-13/ 8,300, 124,000, and 30,100 tons per year could be added to the
18-14 Green, Yampa, White, Blacks Fork, and Little Snake rivers, respectively, by the year 2000. Compared to present values, these sediment yields would be insignificant.

Changes in sediment yield stemming from disturbances directly and indirectly associated with coal development under the leasing alternatives would range widely, depending on required mitigation measures and proximity to perennial streams. Runoff from areas disturbed by surface activities associated with surface or underground mining must not transport offsite more than 30 mg/l total suspended solids as an average daily value for 30 consecutive discharge days (Federal and state regulations).

However discharges for less than 30 days can exceed 30 mg/l, and occurrence of this is frequent. Another factor, which is less predictable, is the probability of a storm event exceeding the design criteria of sediment ponds (10-year, 24-hour). If this occurred, a pond could discharge water having sediment exceeding 30 mg/l. Another major source of sediment would be haul roads that are exempt under current regulations.

Conditions could exist that naturally mitigate excessive sedimentation, such as nearly level slopes and roads, deposition of sediment before reaching a perennial stream, or good fortune in not having a major storm during the life of a mine. Overdesign of sediment control structures to handle expected storms during the life of a mine would also help.

To quantify changes in sediment yield from the leasing and development of new Federal coal is very difficult with available information. Sediment yield rates could remain the same or increase as much as 50 percent. Assuming a 25 percent increase for purposes of analysis, an approximation of sediment yield by the year 2000 is
11-6 shown in table 4-12.

These inferred changes in annual sediment yield are insignificant compared to annual sediment load of the Green, North Platte, White,

TABLE 4-12
SEDIMENT YIELD AT THE YEAR 2000

Alternative	River Basin	Suspended * Sediment * Ton/sq mi/yr	Acres Disturbed On-Site	Acres Disturbed Off-Site	Acres Disturbed Infra-Structure ††	Sediment Increase On-Site**	Sediment Increase Off-Site †	Sediment Increase Net Yield	River Basin Yield Tons/year N. Platte	Green	Blacks Fork	Yampa	White	Little Snake
Deadman	Green	22.5	80	---	--	4	--	4		4				
Leucite Hills	Green	22.5	3,600	67	36	158	4	162		162				
Point of Rocks	Green	22.5	2,780	20	18	122	1	123		123				
Tract 98	Blacks Fork	793.	164	---	--	254	--	254			254			
Prairie Dog	White	268.	40	110	55	21	69	90					90	
Little Middle Creek	Yampa	191.	700	---	--	261	--	261				261		
Middle Creek	Yampa	191.	10	---	4	4	--	4				4		
Low Alternative Subtotal			6,430	197	113				--	289	254	265	90	
Atlantic Rim	Little Snake	509.	7,110	770	160	7,068	919	7,987						7,987
Byrne Creek	Blacks Fork	794.	2,230	30	36	3,454	56	3,510			3,510			
Corral Creek	Platte	41.2	2,272	375	93	183	36	219	219					
Wild Horse Draw	Platte	41.2	945	575	75	76	55	131	131					
Rattlesnake	White	268.	40	40	47	21	25	46					46	
Signal Butte	Yampa	191.	1,082	318	29	404	142	546				546		
Moderate Alternative Subtotal			20,109	2,305	553				350	289	3,764	811	136	7,987
Indian Springs	Platte	41.2	100	100	69	8	10	18	18					
Pio	Green	22.5	2,680	284	36	118	15	133		133				
Winton	Green	22.5	43	62	239	2	3	5		5				
Peck Gulch	Yampa	191.	40	80	81	15	36	51				51		
Iles Mountain	Yampa	191.	1,100	80	40	410	36	446				446		
Fish Creek	Yampa	191.	300	25	65	112	11	123				123		
High Alternative Subtotal			24,292	2,936					368	427	3,764	1,431	136	7,987
Northeast Cow Creek	Little Snake	509.	40	420	226	40	501	541						541
Bell Rock	Yampa	191.	50	45	66	19	20	39				39		
Williams Fork Mountain	Yampa	191.	3,917	65	30	1,461	29	1,490				1,490		
Lay Creek	Yampa	191.	2,066	385	45	771	172	943				943		
Horse Gulch	Yampa	191.	1,143	100	13	426	45	471				471		
Maximum Alternative Subtotal			33,241	3,951	1,463				368	427	3,764	4,374	136	8,528
Percent of Present Yield compared to baseline values in Chapter 3									<1%	<1%	<1%	<1%	<1%	<1%

FOOTNOTES:

NOTE: This table has been revised as a result of comments 18-15 and 18-27.

* Baseline values taken from Chapter 3

** Sediment yield increased to 25% premining levels.

† Off-site disturbance would double yield for 1st two years then 1.5 x sediment rate

†† Infrastructure sediment yield would double for 1st two years then return to premine rate

Comment(s)

18-13 Yampa, Blacks Fork, and Little Snake rivers. Thus, any impacts from changes in erosion and sediment yield over the period of mining should be very local, short-lived, and difficult to measure.

On completion of mining and reclamation and removal of sedimentation ponds, sediment yields from most reclaimed areas are expected to return to approximately predisturbance rates. The notable exceptions would be urbanized areas, which should remain stable over the long term, and possibly the steeper slopes on some of the tracts, which could be difficult to stabilize if the original contour was approximately restored as required by state regulations.

At this time, it is not known whether steep slopes could be returned to their present erosional stability. Successful rehabilitation of steep slopes would depend on the reconstruction of stable channels and the reestablishment of deep-rooted woody plants with a grass understory that is at least comparable to the existing cover. If that stability was not achieved, sediment yield from those areas could increase above the premining rate.

Byrne Creek Tract (Moderate alternative) has an identified sediment yield problem that would constitute a significant onsite impact. Details can be found in the site specific analysis located at the Rock Springs BLM District Office.

Page 150, column 1, paragraph 4 is revised as follows:

The magnitude of water level declines in the vicinity of the mines would depend on aquifer properties, recharge characteristics, rate of pumping, and duration of pumping, but declines would probably not exceed 100 feet within the mined areas and should not greatly exceed 10 feet more than a mile from the mined areas. If any nearby domestic or stockwater wells with an adjudicated water right
18-28/ were significantly impacted, the responsible mining company would
20-3 have to replace the interrupted supplies (Colorado and Wyoming regulations).

The following paragraph is added to the end of the Interruption of Groundwater Flow section on page 150:

20-1 Of all the tracts being studied, the Bell Rock Tract may have the most problems with reversal of hydraulic gradient. The Bell Rock Tract is adjacent to the confluence of the Williams Fork and Yampa rivers and near an alluvial valley floor. After completion of mining, the hydrologic regime of the area would fill the void created by mining. Filling the void with water could have an adverse affect by diminishing water quantity, particularly during a dry period. However, if the problem was substantiated during the permitting process, existing regulations could mitigate this

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impact. One possibility would be to require the lessee to fill the void during a high flow period of the Yampa River rather than allowing the post mining hydrologic regime to fill the void.

Page 152, Unavoidable Adverse Effects section, first two paragraphs are revised as follows:

20-1 Fish and Trout creeks at maximum concentrations would violate state standards for sulfate under the No Action alternative. The leasing alternatives would result in slight additional increases in sulfate. Salinity may also increase locally in drainages around other coal lease tracts under all alternatives. These coal tract drainages, except for those in the North Platte watershed, could contribute to salinity problems downstream, although water in reclaimed mined areas would generally be suitable for livestock and wildlife.

18-24 18-25/ 18-30/ 28-5 The increased salinity in the Colorado River Basin is a controversial impact. The effects of the Maximum alternative would increase the salinity level at Imperial Dam on the Colorado River to a small but significant extent above the No Action alternative level.

The Short-Term Use vs. Long-Term Productivity and Irreversible or Irretrievable Commitments of Resources sections on page 154 are revised as follows:

Short-Term Use vs. Long-Term Productivity

The short-term use of the environment for leasing and development of new Federal coal would create a number of long-term impacts on the productivity of local and regional water resources.

The long-term consumptive use of water, coupled with the increased salt load from sewage effluent and spoil pile leaching, would
20-1 result in a small but significant increase (considerably less than 1.0 mg/l) in the Colorado River at Imperial Dam, California. Leaching of spoils aquifers would increase the salinity of perennial streams adjacent to the tracts over the long term, but, in most cases, the water would still be suitable for most current uses. There is the potential for long-term local increases in surface water salinity, local decreases in groundwater quality, and
20-1 local modification of aquifers around all tracts. Fish and Trout creeks at maximum concentrations would violate state standards for sulfate under the No Action alternative. The leasing alternatives would result in slight additional increases in sulfate concentrations.

Irreversible or Irretrievable Commitments of Resources

Increased consumptive use of water and increased salt load from leaching of replaced spoil aquifers and sewage effluent would

Comment(s)

20-1 irretrievably increase the dissolved solids concentration in the Colorado River at Imperial Dam. Increased sulfate concentrations in Fish and Trout creeks would be irretrievable.

THE ANIMAL LIFE, Aquatic Habitat section, page 159, column 1, last paragraph, is replaced with the following:

12-8 Under the No Action alternative through the year 2000, development in the region would significantly increase consumptive water use, which could, in turn, reduce flows in the White, Green, Yampa, Blacks Fork, and Little Snake watersheds. Increases in salt loading ranging from 3 to 46 percent would occur in these drain ages. The quality of aquatic habitat would decrease due to a significant increase in total dissolved solids (TDS) and sulfate concentration in Colorado's Trout and Fish creeks. Chloride concentration would also increase in Fish Creek.

Beginning with the Low Leasing alternative, the TDS, sulfate, and chloride concentrations would increase slightly in Trout Creek due to mining the Middle Creek and Little Middle Creek tracts. With mining of the Fish Creek Tract under the High Leasing alternative, TDS and sulfate concentrations would increase slightly in Fish Creek. These additional increases would represent only a small portion of the total cumulative impacts (leasing alternatives plus No Action alternative). The Water Resources section quantifies and describes these changes in more detail.

The ANIMAL LIFE, Threatened and Endangered Wildlife section, page 167, column 1, is revised as follows:

Threatened and Endangered Wildlife

18-13 The water resources analysis predicts significant increased consumption of water in the region under the No Action alternative. If this reduces flows, the Colorado squawfish and humpback chub, both federally listed as endangered, may be adversely affected under the No Action alternative. (BLM has no control over this situation.) These species are protected by the Endangered Species Act, so any action that may affect them will be reviewed by the U.S. Fish and Wildlife Service. If their existence is jeopardized, adverse impacts must be mitigated.

Actions under any of the leasing alternatives would not significantly increase consumption and are not expected to adversely affect or jeopardize the continued existence of any federally or state listed threatened or endangered species. Under provisions of the Endangered Species Act of 1973, as amended, Federal actions must be reviewed by the U.S. Fish and Wildlife Service for compliance. The state of Colorado has been consulted regarding their

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listed species. (Wyoming has no state listed species.) Consultation has been completed, with a finding of "not likely to jeopardize any listed species."

The Dispersed Recreation section, page 174, column 2, second complete paragraph, is revised as follows.

1-2 The eastern rim of the Continental Divide passes near the Wild Horse Draw, Corral Canyon, and Atlantic Rim tracts. The Continental Divide Trail is a designated national scenic trail whose proposed route would follow the eastern rim of the divide. It would not be significantly impacted by the proposed mines, although they might be visible at a distance of 1 to 2 miles if the trail was developed along this rim.

The LAND USE section, page 181, column 2, is revised by adding the following new subsection after the first full paragraph:

N/A **Coal Facilities**

Located within the proposed Fish Creek Tract, which occurs under the High and Maximum alternatives, are surface support facilities for an existing adjacent surface mining operation. Facilities include an office building, haul roads, railroad, tipple, crushing facilities, and explosives bunker. If the proposed coal lease was developed prior to the removal of the existing facilities, existing regulation would protect the facilities until such time as they were no longer needed. This could preclude the development of approximately 1,618,000 tons of recoverable coal.

The TRANSPORTATION Highways section, page 215, column 1, is revised by adding the following new third paragraph:

18-46 Recreation traffic generated by increased populations may impact some highways and other public roads which lead to recreation or "playground" areas. Roads leading to national forests, designated parks, boating areas, etc., may have to be upgraded to accommodate increases in traffic. However, no data is available to analyze the effects this may have on roads not already identified.

The following section is added to the end of Chapter 5, PUBLIC PARTICIPATION:

N/A ASSISTANCE IN EIS PREPARATION

Assistance in preparation of the EIS was received from many quarters. The BLM Rawlins and Rock Springs District Coal Assessment Teams provided virtually all Wyoming data and carefully

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reviewed the manuscript; Gene Kolkman and Dean Stilwell served as liaison coordinators. Joe Patti of the BLM Wyoming State Office and Betsy Daniel of the BLM Colorado State Office participated as environmental coordinators. John Carlson of BLM's Washington Office provided coordination and assistance. Ken Smith of the BLM Colorado State Office served as project manager.

Many individuals contributed to preparation of the site specific analysis reports or served on the two tract delineation teams. These persons are listed below.

Wyoming Tract Delineation Team

Jim Taylor
Rod Noah
Barbara Pittman
Wally Stiles
Steve Wiig

Rawlins District Site Specific Analysis Team

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Comment(s)

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Karen Eberle
Herb Conley
Hal Keesling
David Cooper
Scott Archer
Lane Osborn
Kermit Witherbee
David Bray

The CORRAL CANYON TRACT, Significant Impacts or Issues section, page 240, column 1, is revised to read as follows:

N/A ← Significant Impacts or Issues

The Corral Canyon Tract has been exchanged. It is assumed that the tract will still be developed in private ownership. The exchange is now in litigation. In the event that the tract is returned to Federal ownership, it could be considered for leasing.

The FISH CREEK TRACT section, pages 249-250, is revised as follows:

FISH CREEK TRACT

N/A

General location: Routt County, 12 miles northwest of Oak Creek, Colorado
Tract size (acres): 3,336.53
Surface ownership: 100% private
Mineral ownership: 100% Federal
Type of mine: Surface and subsurface
Rank of coal: High volatile C bituminous
Total coal resource (million tons): 149.2
Total recoverable reserve (million tons): 69.0
Annual production (million tons): 1.0
Mine life (years): 69 (3--surface and 66--subsurface)
Mine-related disturbance (acres): 325
Secondary surface disturbance (acres): 65
Transportation: No new transportation required

Significant Impacts or Issues

The site specific analysis identified several significant impacts under the Development Alternative. Routt County would benefit economically from mine-generated taxes and additional revenues generated from an increase in population.. The increase in population would significantly affect both Oak Creek and Phippsburg. The impact would be of low significance because of a projected small growth rate for Phippsburg and the high social readiness of Oak Creek.

Comment(s)

An important impact would be the exclusion of about 150,000 tons of coal that underlies a permanent residence within the tract. However, the coal could be mined if the lessee was able to purchase the property. Existing surface support facilities for an adjacent surface mine could preclude development of approximately 1.6 million tons of coal if the subsurface coal in the area was developed before the facilities were removed.

An unknown potential impact could occur to the Fish Creek alluvial valley floor (AVF). Direct impacts to the AVF on-tract are not anticipated; however, the impact of tract development on the water supply to the alluvial valley floor off-tract is not known.

The presence of three golden eagle nests has resulted in the designation of a 280-acre buffer zone as unsuitable for surface occupancy and mining. Surface mining of coal would not be precluded since mineable coal is not present within the buffer zone. Subsurface coal mining should not impact the nesting area, since no surface disturbance is expected, given the depth of mining and competency of the overburden.

Surface mining is expected to increase the salt load contributed to Fish Creek. This would return to premining levels shortly after reclamation was completed.

In an effort to lessen cumulative impacts of simultaneously leasing adjacent tracts containing mule deer; elk; and sharp-tailed, blue, and sage grouse reproduction areas and golden eagle nesting areas, mitigation has been committed in the form of special leasing stipulations.

The 24-hour total suspended particulate ambient air quality standards are predicted to be exceeded from processing facilities emissions on and off tract at the proposed Fish Creek Tract. These potential impacts would be mitigated during detailed development planning and other permitting reviews.

Short-term impacts of mining this tract could include:

1. The production 69 million tons of Federal coal
2. Removal of 2,732 acres from livestock/wildlife grazing and farming (604 acres are already being used for coal development)
3. An additional 45 jobs during construction and 80 jobs during surface mining, which would increase to 250 during underground mining
4. Ad valorem taxes, severance taxes, and Federal royalties generating additional revenues of $9,000,000

Comment(s)

Long-term impacts predicted could include:

1. Approximately 80.2 million tons of coal resources would be unrecoverable with present technology, with an additional 1.8 million tons of recoverable coal possibly precluded to protect surface structures.
2. The tract would be returned to present land use management.
3. The social and economic impacts would be short-lived. The communities would have the capacity to deal with larger populations and the services required.
4. Reclamation would return tract disturbances to a premining productivity.

APPENDIX 6, MITIGATION REQUIREMENTS, All Colorado and Wyoming Tracts, page 278, is revised by adding the following paragraph to the end of the section:

N/A The lessee must protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage during operations on the lease areas. If any monuments, corners, or accessories are destroyed, obliterated, or damaged by this operation, the lessee will hire an appropriate county surveyor or registered land surveyor to reestablish or restore them at the same locations. Surveying procedures must be carried out in accordance with the Manual of Surveying Instruction for the Survey of Public Lands of the United States, and the surveyor will record the survey in the appropriate county records and send a copy to the authorized officer.

APPENDIX 6, MITIGATION REQUIREMENTS, pages 278 and 279, is revised as follows:

All Wyoming Tracts

18-10
18-31 1. The lessee will be required to monitor and inventory the lease area for establishment of potential black-footed ferret habitat (i.e. prairie dog towns) and, if any such habitat is found, to conduct ferret inventories, all in accordance with the guidelines below. In the event that ferret occurrence is identified, the lessee will be required to adhere to any suggested modifications in the mining operation provided by the U.S. Fish and Wildlife Service and the BLM.

The following Black-Footed Ferret Inventory Guidelines will be followed. Proposed developments such as coal lease lands, power plant sites, well fields, dam sites, and other major, block-type developments should be surveyed for prairie dogs before the project is approved. If prairie dogs are found on the proposed site, colonies should be mapped on topographic maps and each colony surveyed using recommended Black-Footed Ferret Survey Procedures. Ferret searches should be scheduled as close to actual construction as is reasonable to minimize the possibility of missing ferrets

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that might move onto the area during the period between completion of surveys and the start of construction. Where project disturbance takes place over a long period of time, such as on a coal site, additional surveys for black-footed ferrets are recommended.

2. The lessee shall prepare and submit to BLM, concurrently with the filing of a permit application package, a hydrologic mitigation study, which includes a factual statement of the following:

a. Identification of all affected surface water, water table (unconfined), and artesian (confined) waters, including the location and direction of movement of all groundwater.

b. Appropriate characteristics of the waters, which might include yield or flow; conductance; pH; temperature; alkalinity; total dissolved solids; dissolved amounts of such elements as sulfates, chlorides, barium, cadmium, copper, iron, lead, radioactive materials, etc.; turbidity; and total dissolved oxygen.

c. Identification of development activities that would affect the above waters and the probable impact to such waters from each activity.

d. A discussion of the interrelationships between surface and groundwater in the project area and the likely effects to this relationship of developing the Federal coal.

e. Identification of proposed mitigation measures to reduce the impacts identified in (c) above.

f. Identification of impacts to waters and related elements of the environment (e.g., aquatic life, wildlife habitat, agricultural lands, etc.) that cannot be mitigated.

g. A plan for monitoring surface and groundwater conditions in the project area and downstream from the project. The water quality standards of the Wyoming Department of Environmental Quality and the U.S. Public Health Service shall be used where applicable.

h. The hydrologic study by each lessee shall specifically address the protection of any water rights that might be affected by the proposed mining.

Indian Springs, Atlantic Rim, Northeast Cow Creek, Corral Canyon, and Wild Horse Draw Tracts

1. In order to protect nesting eagles, prairie falcons, and ferruginous hawks and their associated buffer zones (i.e., pertinent to application of coal unsuitability criteria numbers 11, 13, and 14), no surface coal mining operations will be allowed

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on such lands. Any exceptions (if granted) for support facilities (e.g., telephone lines, powerlines, pipelines, surface facilities, etc.) will require that no surface disturbing activities are to take place in such areas during breeding and nesting seasons (March 15 - July 15). In addition, such exceptions will be subject to restrictive placement and type or design of facilities, seasonal occupancy, etc., and may be allowed only with prior written permission of the authorized officer. Since these and other bird species (i.e., pertinent to coal unsuitability criteria numbers 11, 12, 13, and 14) may move onto or off a given area or elsewhere in the project area, their activities must be monitored to determine changing protection requirements.

Indian Springs, Atlantic Rim, Northeast Cow Creek, Corral Canyon, Wild Horse Draw, Pio, and Byrne Creek Tracts

1. Recovery of wildlife habitat on the project area shall be required. The lessee will be required to mitigate habitat loss because of surface coal mining operations in the project area. Mitigation methods may require the lessee to employ techniques for wildlife forage manipulation or intensive wildlife habitat management. Habitat recovery may not be completely feasible in the project area; therefore, recovery or replacement may be accomplished on lands made available through the surface management agency, the states, or the lessee outside the project area in combination with recovery and replacement methods on suitable lands within the project area. In regard to the above, the lessee shall be required to develop a habitat recovery and replacement plan designed to protect and/or enhance wildlife habitat. This plan shall be prepared before mining plan approval and shall be prepared in consultation with and subject to approval by BLM, U.S. Fish and Wildlife Service, OSM and the state of Wyoming. The habitat recovery and replacement plan shall include, but is not limited to:

a. A detailed description of the methods selected by the lessee to mitigate habitat loss, together with a comparative analysis of alternate methods which were considered and rejected by the lessee and the rationale for the decision to select the proposed methods. The replacement may include, but is not limited to, the following techniques.

APPENDIX 6, MITIGATION REQUIREMENTS, All Colorado Tracts, page 282, column 1, revise item 2 to read:

12-6 2. In the event the lessee should need to occupy or use public lands having public access routes thereon or interrupt the use of public access routes on public lands for coal leasing activities, including but not limited to the mining, recovery, refining, and removal of coal, the lessee shall provide, prior to initiating such preemptory use, suitable alternate access. Such alternate access

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shall be comparable to the disrupted access facility and satisfactory to the appropriate BLM authorized official. Furthermore, such substitute access facility shall be provided free of construction and relocation expense to the United States of America or any state or local government having use jurisdiction over the impacted public access route.

In the event suitable alternative access is provided over lessee's privately-owned lands, the lessee shall also provide an appropriate deed or easement document, in recordable form, for said public access purposes to the appropriate government agency, i.e., county, state, or Federal, having prelease access jurisdiction.

APPENDIX 6, MITIGATION REQUIREMENTS; Horse Gulch, Bell Rock, Iles Mountain, Middle Creek, and Prairie Dog Tracts; pages 282 and 283, revise to read as follows:

N/A **Horse Gulch, Bell Rock, Iles Mountain, Middle Creek, and Prairie Dog Tracts**

1. All tracts which affect powersite withdrawals shall have the following stipulation incorporated into the lease:

a. The lessee shall not in any manner interfere with the use of the lands for hydroelectric project purposes. Coal operations will be discontinued at any time BLM, the Federal Energy Regulatory Commission, or a permittee or licensee under Part I of the Federal Power Act perceives interference with any current or future hydroelectric project purpose and demands discontinuation. Operations may be resumed if (1) the demand for discontinuance is withdrawn, or (2) the Federal Energy Regulatory Commission, upon request of BLM, overrules a demand by a permittee or licensee.

b. It is understood and agreed that no compensation shall accrue to the coal lessee for any expense, or loss of prospective profits resulting from any use of the lands for hydroelectric project purposes.

APPENDIX 6, MITIGATION REQUIREMENTS, page 284, add the following:

N/A **Little Middle Creek**

1. To protect nesting prairie falcons, no surface occupancy will be allowed at any time, and no activity will be allowed between February 1 and July 31 annually in the following area:

T. 4 N., R. 86 W.,
sec. 30, lots 3 and 4

A new appendix--APPENDIX 7, INPUT PARAMETERS FOR SALT LOADING MODELING--is added to the EIS. It appears at the end of this volume.

Bibliography: Add the following:

Bureau of Land Management, Bureau of Reclamation, Geologic Survey, 1982. Resource and Potential Reclamation Evaluation, 1977-81 Fish Creek Study Site EMRIA Report 18-77. U.S. Department of the Interior, Government Printing Office, Washington D.C.

Colorado Department of Health, 1980. Classification and Numeric Standards, Upper Colorado River Basin and North Platte River (Planning Region 12) Effective June 9, 1980.

Colorado Mined Land Reclamation Division, April 1983, Foidel Creek Proposed Decision and Findings of Compliance, File No. C-056-82, Colorado Department of Natural Resources, Denver, Colorado.

Colorado Mined Land Reclamation Division, August 1983, Proposed Decision and Findings of Compliance for the Empire Energy Corporation Eagles Mines No. 5 & 9, Colorado Department of Natural Resources, Denver, Colorado.

Maura, W.S., 1983. Dissolved Water-Quality Data for Streams in the Southern Yampa River Basin, Northwestern Colorado. Open file Report 82-1017.

Parker, Randolph S. and J. Michael Norris. 1983. Simulated Effects of Anticipated Coal Mining on Dissolved Solids in Selected Tributaries of the Yampa River, North Western Colorado USGS Water-Resources Investigations Report 83-4084, Lakewood, Colorado.

PHS (1962) U.S. Department of Health, Education, and Welfare. Public Health Service (1962), "Public Health Service drinking water standards," rev. 1962 [PHS pub. 956] (Government Printing Office, Washington, D.C.), 61 p.

ERRATA

This section presents minor corrections by page number in Volume 1. Some are the result of comments presented in the previous section; others were generated by the EIS team to add information or correct oversights. Note that partial paragraphs at the top of columns are not included in paragraph numbering below; paragraph 2 thus means the second complete paragraph. Also included in this section are additional references.

Comment	Page	
N/A	5	Column 1, Authorities for Coal Leasing and Development section, paragraph 2, line 8: replace "maximum economic recovery" with "surface owner consent."
N/A	5-6	Time Frames section: delete the first and last paragraphs.
N/A	8	Column 2, paragraph 2, line 2: change "BLM's preferred alternative" to "the Regional Coal Team's preferred alternative."
18-47	10	Figure 2-1: Change title to read, "Projected Annual Baseline Coal Production for Three Colorado Counties." On right vertical axis, change "Colorado Total" to read "Three-County Total."
18-47	11	Figure 2-2: Change title to read, "Projected Annual Baseline Coal Production for Four Wyoming Counties." On right vertical axis, change "Wyoming Total" to read "Four-County Total."

Comment	Page	
N/A	14	Table 2-3: make the following acreage changes pertaining to the Fish Creek Tract: Total Acres 3,336.5, Federal Mineral Estate 3,336.5, Private Surface Estate 3,336.5. Totals following the Fish Creek Tract entry should be changed accordingly.
N/A	17-18	Table 2-6 and Table 2-7: make the following coal reserve changes to the Fish Creek Tract: In-place Federal Resource 149.2 and Total Resource 149.2, Recoverable Federal Resource 69.0 and Total Resource 69.0. Subtotal and Total Coal Reserves figures should be changed accordingly.
18-48	19-22	Tables 2-8 through 2-11: change second line of table title to read, "ACRES DISTURBED (CUMULATIVE TOTALS)."
18-54	54	Figure 3-3: change "LEWIS SN" to read "LEWIS SH."
18-55	55	Column 1, first partial paragraph, line 3: change "3.0 to 6.0" to "III and VI;" line 8: add "A number of seismic disturbances were observed in 1973; some may have been related to blasting in existing coal mines."
18-56	55	Column 2, paragraph 2, sentence 1: revise to read, "Mesaverde coals of the Green River coal field range from subbituminous to high-volatile C bituminous in rank, with most coals classified as subbituminous B and averaging 12 feet thick.

Comment	Page	
18-58	55	Column 2, paragraph 2, line 11: change "380 million" to "1.8 billion."
18-57	55	Column 2, paragraph 3, line 3: change "313" to "603."
15-6	75	Table 3-14, entry 2 (Sagebrush): add "raptors" to Wildlife Species column.
15-8/ 18-3	78	Column 2, paragraph 7, sentence 1: revise to read, "Columbian sharp-tailed grouse occur as separated small populations in Routt and Moffat counties, Colorado, and near Savery, Wyoming."
15-8/ 18-3	79	Column 1, first partial paragraph, sentence 1: revise to read, "They are classified as rare in Wyoming and unusual by the Colorado Division of Wildlife."
15-6	79	Column 1, paragraph 2, sentence 1: revise to read, "Many shrews, voles, mice, rabbits and hares (lagomorphs), bats, and ground squirrels are common or abundant within the habitat analysis area."
15-10	82	Column 2, paragraph 5, line 3: change "nest" to "roost."

Comment	Page	
15-11	84	Table 3-16, entry 4 (Greater sandhill crane): revise under "Occurrence" column to read "Colorado and Wyoming;" footnote 2, revise last item to read "(S) = Colorado State list."
N/A	86	Table 3-17: revise High Alternative, Fish Creek entry, as follows: Total Known Sites, "7"; Potentially Eligible to the National Register, "2"; Not Eligible, "5"; Percent of Tract Surveyed (Class III), "48.4". Revise last column (cumulative totals) under High and Maximum alternatives to read "243 Total Known Sites" and "258 Total Known Sites," respectively. Revise last line of table (totals) as follows: Total Known Sites, "258"; Potentially Eligible to the National Register, "24"; Not Eligible, "126."
24-2	91	Column 2, paragraph 1, sentence 2: change to read, "Designation of these rivers is pending Congressional action."
14-20	93	Column 2, paragraph 5, line 8: delete "Several."
18-41	95	Column 1, paragraph 2, line 4: change "cow" to "cow/calf."
N/A	95	Column 1, paragraph 5, line 1: change to read "Other land uses include coal and uranium mining with associated surface support facilities, ..."

Comment	Page	
18-39	131	Column 2, paragraph 7, line 3: delete "material."
12-8	163	Column 1, last paragraph: delete last sentence.
12-8	168	Table 4-21: delete entry for "Game Fish" and all associated impacts.
N/A	181	Column 2, paragraph 3, sentence 3: revise to read, "BLM has coordinated with the Federal Energy Regulatory Commission and will incorporate the recommended powersite stipulation received on December 22, 1983."
N/A	182	Column 1, first partial paragraph, last sentence: revise to read, "The appropriate stipulation will be incorporated into the lease if these tracts are leased for coal development."
N/A	182	Column 2, first partial paragraph, line 2: change "six" to "seven."
N/A	182	Column 2, paragraph 3: revise last sentence to read, "Subsurface mining would not affect this residence or a second dwelling on the tract due to the presence of sufficient overburden depths."

Comment	Page	
N/A	183	Column 1, Unavoidable Adverse Effects, item 1: revise first sentence to read, "The conversion of ranch lands to mining uses and the loss of AUMs associated with this conversion would significantly impact one operator under the High and Maximum alternatives and another operator under the Maximum alternative."
14-23	223	Column 2, delete paragraph 1 (Potential Mitigation).
6-1	283	Column 2, line 1: delete "sec. 21, W1/2 and W1/2E1/2."
N/A	284	Column 1, item 1 under Fish Creek Tract section: add a third legal description to read as follows: "T. 5 N., R. 86 W., "sec. 31, portions of lots 1, 2, E1/2NW1/4, W1/2, and NE1/4 lying north and east of Routt County Road 27"
12-10	284	Column 1, item 3 under Fish Creek Tract section: delete entire item.
N/A	291	Revise Department of the Interior entry to read "U.S. Department of the Interior, 1983. Quality of Water, Colorado River Basin, Progress Report No. 11."

NOTICE

The Green River-Hams Fork Final Coal EIS consists of two volumes. This is Volume 2. Volume 1 is the Draft EIS, which was printed and distributed in August 1983. Comments received on the Draft EIS did not require extensive changes in the data, analyses, or conclusions. Therefore, the Draft EIS has not been reprinted; it is incorporated by reference.

Dear Reader:

Enclosed is Volume 2 of the Green River-Hams Fork Coal Region Round Two Final Environmental Impact Statement (EIS). The Draft EIS, issued August 8, 1983, now serves as Volume 1 of the Final EIS. Volume 2 includes a summary of the proposed action and alternatives, changes to the EIS resulting from public review and comment, a record of the public comments on the DEIS, and responses to those comments. Volumes 1 and 2 together constitute the Final EIS.

The EIS is one of several inputs or factors in the decision process. No action can be taken for at least thirty (30) days following filing of the Final EIS with the Environmental Protection Agency.

Copies of both Volume 2 and Volume 1 are available on request from the Bureau of Land Management, Little Snake Resource Area, P.O. Box 1136, Craig, Colorado 81626.

BLM thanks all those individuals and organizations who provided suggestions and comments on the EIS. Your help has been invaluable in the preparation of an EIS which will assist us to more efficiently and effectively manage public resources.

Sincerely yours,

State Director